

APPENDICES



APPENDIX 1

The Act Establishing the Las Cienegas National Conservation Area

One Hundred Sixth Congress
of the

United States of America
AT THE SECOND SESSION

Begun and held at the City of Washington on Monday, the twenty-fourth day of January, two thousand
An Act

To establish the Las Cienegas National Conservation Area in the State of Arizona.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. DEFINITIONS

For the purposes of this Act, the following definitions apply:

(1) CONSERVATION AREA - The term `Conservation Area' means the Las Cienegas National Conservation Area established by section 4(a).

(2) ACQUISITION PLANNING DISTRICT - The term 'Acquisition Planning District' means the Sonoita Valley Acquisition Planning District established by section 2(a).

(3) MANAGEMENT PLAN - The term `management plan' means the management plan for the Conservation Area.

(4) PUBLIC LANDS - The term `public lands' has the meaning given the term in section 103(e) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1702(e)), except that such term shall not include interest in lands not owned by the United States.

(5) SECRETARY - The term `Secretary' means the Secretary of the Interior.

SECTION 2. ESTABLISHMENT OF THE SONOITA VALLEY ACQUISITION PLANNING DISTRICT

(a) IN GENERAL - In order to provide for future acquisitions of important conservation land within the Sonoita Valley region of the State of Arizona, there is hereby established the Sonoita Valley Acquisition Planning District.

(b) **AREAS INCLUDED** - The Acquisition Planning District shall consist of approximately 142,800 acres of land in the Arizona counties of Pima and Santa Cruz, including the Conservation Area, as generally depicted on the map entitled 'Sonoita Valley Acquisition Planning District and Las Cienegas National Conservation Area' and dated October 2, 2000.

(c) **MAP AND LEGAL DESCRIPTION** - As soon as practicable after the date of the enactment of this Act, the Secretary shall submit to Congress a map and legal description of the Acquisition Planning District. In case of a conflict between the map referred to in subsection (b) and the map and legal description submitted by the Secretary, the map referred to in subsection (b) shall control. The map and legal description shall have the same force and effect as if included in this Act, except that the Secretary may correct clerical and typographical errors in such map and legal description. Copies of the map and legal description shall be on file and available for public inspection in the Office of the Director of the Bureau of Land Management, and in the appropriate office of the Bureau of Land Management in Arizona.

SECTION 3. PURPOSES OF THE ACQUISITION PLANNING DISTRICT

(a) **IN GENERAL** - The Secretary shall negotiate with land owners for the acquisition of lands and interest in lands suitable for Conservation Area expansion that meet the purposes described in section 4(a). The Secretary shall only acquire property under this Act pursuant to section 7.

(b) **FEDERAL LANDS** - The Secretary, through the Bureau of Land Management, shall administer the public lands within the Acquisition Planning District pursuant to this Act and the applicable provisions of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.), subject to valid existing rights, and in accordance with the management plan. Such public lands shall become part of the Conservation Area when they become contiguous with the Conservation Area.

(c) **FISH AND WILDLIFE** - Nothing in this Act shall be construed as affecting the jurisdiction or responsibilities of the State of Arizona with respect to fish and wildlife within the Acquisition Planning District.

(d) **PROTECTION OF STATE AND PRIVATE LANDS AND INTERESTS** - Nothing in this Act shall be construed as affecting any property rights or management authority with regard to any lands or interest in lands held by the State of Arizona, any political subdivision of the State of Arizona, or any private property rights within the boundaries of the Acquisition Planning District.

(e) **PUBLIC LANDS** - Nothing in this Act shall be construed as in any way diminishing the Secretary's or the Bureau of Land Management's authorities, rights, or responsibilities for managing the public lands within the Acquisition Planning District.

(f) **COORDINATED MANAGEMENT** - The Secretary shall coordinate the management of the public lands within the Acquisition Planning District with that of surrounding county, State, and private lands consistent with the provisions of subsection (d).

SECTION 4. ESTABLISHMENT OF THE LAS CIENEGAS NATIONAL CONSERVATION AREA

(a) **IN GENERAL** - In order to conserve, protect, and enhance for the benefit and enjoyment of present and future generations the unique and nationally important aquatic, wildlife, vegetative, archaeological, paleontological, scientific, cave, cultural, historical, recreational, educational, scenic, rangeland, and riparian resources and values of the public lands described in subsection (b) while allowing livestock grazing and recreation to continue in appropriate areas, there is hereby established the Las Cienegas National Conservation Area in the State of Arizona.

(b) **AREAS INCLUDED** - The Conservation Area shall consist of approximately 42,000 acres of public lands in the Arizona counties of Pima and Santa Cruz, as generally depicted on the map entitled 'Sonoita Valley Acquisition Planning District and Las Cienegas National Conservation Area' and dated October 2, 2000.

(c) **MAPS AND LEGAL DESCRIPTION** - As soon as practicable after the date of the enactment of this Act, the Secretary shall submit to Congress a map and legal description of the Conservation Area. In case of a conflict between the map referred to in subsection (b) and the map and legal description submitted by the Secretary, the map referred to in subsection (b) shall control. The map and legal description shall have the same force and effect as if included in this Act, except that the Secretary may correct clerical and typographical errors in such map and legal description. Copies of the map and legal description shall be on file and available for public inspection in the Office of the Director of the Bureau of Land Management, and in the appropriate office of the Bureau of Land Management in Arizona.

(d) **FOREST LANDS** - Any lands included in the Coronado National Forest that are located within the boundaries of the Conservation Area shall be considered to be a part of the Conservation Area. The Secretary of Agriculture shall revise the boundaries of the Coronado National Forest to reflect the exclusion of such lands from the Coronado National Forest.

SECTION 5. MANAGEMENT OF THE LAS CIENEGAS NATIONAL CONSERVATION AREA

(a) **IN GENERAL** - The Secretary shall manage the Conservation Area in a manner that conserves, protects, and enhances its resources and values, including the resources and values specified in section 4(a), pursuant to the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) and other applicable law, including this Act.

(b) **USES** - The Secretary shall allow only such uses of the Conservation Area as the Secretary finds will further the purposes for which the Conservation Area is established as set forth in section 4(a).

(c) **GRAZING** - The Secretary of the Interior shall permit grazing subject to all applicable laws, regulations, and Executive orders consistent with the purposes of this Act.

(d) **MOTORIZED VEHICLES** - Except where needed for administrative purposes or to respond to an emergency, use of motorized vehicles on public lands in the Conservation Area shall be allowed only-- (1) before the effective date of a management plan prepared pursuant to section 6, on roads and trails designated for use of motorized vehicles in the management plan that applies on the date of the enactment of this Act; and (2) after the effective date of a management plan prepared pursuant to section 6, on roads and trails designated for use of motor vehicles in that management plan.

(e) **MILITARY AIRSPACE** - Prior to the date of the enactment of this Act the Federal Aviation Administration approved restricted military airspace (Areas 2303A and 2303B) which covers portions of the Conservation Area. Designation of the Conservation Area shall not impact or impose any altitude, flight, or other airspace restrictions on current or future military operations or missions. Should the military require additional or modified airspace in the future, the Congress does not intend for the designation of the Conservation Area to impede the military from petitioning the Federal Aviation Administration to change or expand existing restricted military airspace.

(f) **ACCESS TO STATE AND PRIVATE LANDS** - Nothing in this Act shall affect valid existing rights-of-way within the Conservation Area. The Secretary shall provide reasonable access to nonfederally owned lands or interest in lands within the boundaries of the Conservation Area.

(g) **HUNTING** - Hunting shall be allowed within the Conservation Area in accordance with applicable laws and regulations of the United States and the State of Arizona, except that the Secretary, after consultation with the Arizona State wildlife management agency, may issue regulations designating zones where and establishing periods when no hunting shall be permitted for reasons of public safety, administration, or public use and enjoyment.

(h) **PREVENTATIVE MEASURES** - Nothing in this Act shall preclude such measures as the Secretary determines necessary to prevent devastating fire or infestation of insects or disease within the Conservation Area.

(i) **NO BUFFER ZONES** - The establishment of the Conservation Area shall not lead to the creation of protective perimeters or buffer zones around the Conservation Area. The fact that there may be activities or uses on lands outside the Conservation Area that would not be permitted in the Conservation Area shall not preclude such activities or uses on such lands up to the boundary of the Conservation Area consistent with other applicable laws.

(j) **WITHDRAWALS** - Subject to valid existing rights all Federal lands within the Conservation Area and all lands and interest therein which are hereafter acquired by the United States are hereby withdrawn from all forms of entry, appropriation, or disposal under the public land laws and from location, entry, and patent under the mining laws, and from operation of the mineral leasing and geothermal leasing laws and all amendments thereto.

SECTION 6. MANAGEMENT PLAN

(a) **PLAN REQUIRED** - Not later than 2 years after the date of the enactment of this Act, the Secretary, through the Bureau of Land Management, shall develop and begin to implement a comprehensive management plan for the long-term management of the public lands within the Conservation Area in order to fulfill the purposes for which it is established, as set forth in section 4(a). Consistent with the provisions of this Act, the management plan shall be developed--(1) in consultation with appropriate departments of the State of Arizona, including wildlife and land management agencies, with full public participation; (2) from the draft Empire-Cienega Ecosystem Management Plan/EIS, dated October 2000, as it applies to Federal lands or lands with conservation easements; and (3) in accordance with the resource goals and objectives developed through the Sonoita Valley Planning Partnership process as incorporated in the draft Empire-Cienega Ecosystem Management Plan/EIS, dated October 2000, giving full consideration to the

management alternative preferred by the Sonoita Valley Planning Partnership, as it applies to Federal lands or lands with conservation easements.

(b) CONTENTS - The management plan shall include--(1) provisions designed to ensure the protection of the resources and values described in section 4(a); (2) an implementation plan for a continuing program of interpretation and public education about the resources and values of the Conservation Area; (3) a proposal for minimal administrative and public facilities to be developed or improved at a level compatible with achieving the resource objectives for the Conservation Area and with the other proposed management activities to accommodate visitors to the Conservation Area; (4) cultural resources management strategies for the Conservation Area, prepared in consultation with appropriate departments of the State of Arizona, with emphasis on the preservation of the resources of the Conservation Area and the interpretive, educational, and long-term scientific uses of these resources, giving priority to the enforcement of the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa et seq.) and the National Historic Preservation Act (16 U.S.C. 470 et seq.) within the Conservation Area; (5) wildlife management strategies for the Conservation Area, prepared in consultation with appropriate departments of the State of Arizona and using previous studies of the Conservation Area; (6) production livestock grazing management strategies, prepared in consultation with appropriate departments of the State of Arizona; (7) provisions designed to ensure the protection of environmentally sustainable livestock use on appropriate lands within the Conservation Area; (8) recreation management strategies, including motorized and nonmotorized dispersed recreation opportunities for the Conservation Area, prepared in consultation with appropriate departments of the State of Arizona; (9) cave resources management strategies prepared in compliance with the goals and objectives of the Federal Cave Resources Protection Act of 1988 (16 U.S.C. 4301 et seq.); and (10) provisions designed to ensure that if a road or trail located on public lands within the Conservation Area, or any portion of such a road or trail, is removed, consideration shall be given to providing similar alternative access to the portion of the Conservation Area serviced by such removed road or trail.

(c) COOPERATIVE AGREEMENTS - In order to better implement the management plan, the Secretary may enter into cooperative agreements with appropriate Federal, State, and local agencies pursuant to section 307(b) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1737(b)).

(d) RESEARCH ACTIVITIES - In order to assist in the development and implementation of the management plan, the Secretary may authorize appropriate research, including research concerning the environmental, biological, hydrological, cultural, agricultural, recreational, and other characteristics, resources, and values of the Conservation Area, pursuant to section 307(a) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1737(a)).

SECTION 7. LAND ACQUISITION

(a) IN GENERAL-(1) PRIORITY TO CONSERVATION EASEMENTS - In acquiring lands or interest in lands under this section, the Secretary shall give priority to such acquisitions in the form of conservation easements. (2) PRIVATE LANDS- The Secretary is authorized to acquire privately held lands or interest in lands within the boundaries of the Acquisition Planning District only from a willing seller through donation, exchange, or purchase. (3) COUNTY LANDS- The Secretary is authorized to acquire county lands or interest in lands within the boundaries of the Acquisition Planning District only with the consent of the county through donation, exchange, or purchase. (4) STATE LANDS-(A) IN GENERAL- The Secretary is authorized to acquire lands or interest in lands owned by the State of Arizona located within the boundaries of the Acquisition Planning District only with the consent of the State and in accordance with State law, by

donation, exchange, or purchase. (B) CONSIDERATION- As consideration for the acquisitions by the United States of lands or interest in lands under this paragraph, the Secretary shall pay fair market value for such lands or shall convey to the State of Arizona all or some interest in Federal lands (including buildings and other improvements on such lands or other Federal property other than real property) or any other asset of equal value within the State of Arizona. (C) TRANSFER OF JURISDICTION- All Federal agencies are authorized to transfer jurisdiction of Federal lands or interest in lands (including buildings and other improvements on such lands or other Federal property other than real property) or any other asset within the State of Arizona to the Bureau of Land Management for the purpose of acquiring lands or interest in lands as provided for in this paragraph.

(b) MANAGEMENT OF ACQUIRED LANDS - Lands acquired under this section shall, upon acquisition, become part of the Conservation Area and shall be administered as part of the Conservation Area. These lands shall be managed in accordance with this Act, other applicable laws, and the management plan.

SECTION 8. REPORTS TO CONGRESS

(a) PROTECTION OF CERTAIN LANDS - Not later than 2 years after the date of the enactment of this Act, the Secretary shall submit to Congress a report describing the most effective measures to protect the lands north of the Acquisition Planning District within the Rincon Valley, Colossal Cave area, and Agua Verde Creek corridor north of Interstate 10 to provide an ecological link to Saguaro National Park and the Rincon Mountains and contribute to local government conservation priorities.

(b) IMPLEMENTATION OF THIS ACT - Not later than 5 years after the date of the enactment of this Act, and at least at the end of every 10-year period thereafter, the Secretary shall submit to Congress a report describing the implementation of this Act, the condition of the resources and values of the Conservation Area, and the progress of the Secretary in achieving the purposes for which the Conservation Area is established as set forth in section 4(a).

Speaker of the House of Representatives. Vice President of the United States and President of the Senate.
Reference: Public Law 106-538 (December 6, 2000)

APPENDIX 2

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1. DESCRIPTION OF MANAGEMENT GUIDANCE COMMON TO ALL ALTERNATIVES

The following management guidance common to all alternatives summarizes the policies, regulations, and laws that guide and affect the management of public lands and resources for each resource program.

WATERSHED MANAGEMENT

The Federal Land and Policy Act of 1967 (FLPMA) defines BLM's multiple use management mission to include protection of watersheds. FLPMA requires that public lands be managed to protect scientific, environmental, air and atmospheric, and water resources. FLPMA also requires (1) that BLM develop land use plans to guide the management actions on these lands and (2) that land use plans comply with state and federal air, water, and pollution standards.

FLPMA requires compliance with the following laws:

1. Soil Conservation and Domestic Allotment Act of 1935.
2. Watershed Protection and Flood Control Act of 1954.
3. Colorado River Basin Salinity Control Act of 1974.
4. Wild and Scenic Rivers Act of 1968.
5. National Environmental Policy Act of 1969.
6. Federal Pollution Control Act with amendments of 1972.
7. Clean Water Act of 1989.
8. Safe Drinking Water Act of 1977.

The Clean Air Act of 1970 and the 1990 amendments govern air quality. BLM Manual 7000 and executive orders provide field guidance in managing soil, water, and air.

SOILS MANAGEMENT

The common goal of all the alternatives in this resource management plan is to minimize soil erosion and rehabilitate eroded areas to maintain and enhance watershed condition and reduce nonpoint source pollution that could result from rangeland management use and activities.

BLM's current grazing regulations (43CFR part 4000) provide Standards and Guidelines for Rangeland Health. BLM has supplemented regulations to be more responsive to land management in Arizona. These regulations apply to all BLM-administered lands where livestock grazing is permitted. The standards provide objectives that must be achieved for BLM-managed soil, water, and vegetation resources. BLM evaluates activities proposed in erosion-prone areas through the National Environmental Policy Act process to determine expected impacts and mitigating measures needed to abate possible impacts.

WATER MANAGEMENT

BLM's mandate of the water resource program consists of the following:

- To ensure the physical presence and legal availability of water on public lands.
- To ensure that those waters meet or exceed federal and state water quality standards for specific uses.
- To mitigate activities to prevent water quality degradation.

The water resource program is divided into three parts: (1) water inventory (2) water rights, and (3) monitoring.

Water Inventory: BLM policy is to inventory all water resources on public lands it administers and to document and store this data in its Water Data Management System.

Water Rights: BLM policy is to file for water rights on all water sources on public and acquired lands in accordance with State of Arizona water laws.

Water Quality: BLM monitors water quality to assess resource impacts from specific activities and to obtain baseline resource information.

Nonpoint source pollution abatement authority is addressed in Section 319 of the Federal Clean Water Act Amendments of 1987 and the State of Arizona Environmental Quality Act (EQA) of 1986. The Arizona Department of Environmental Quality (ADEQ) is the state agency responsible for nonpoint source water pollution control and abatement. ADEQ annually reports on the status of the water quality and any impaired waters. For more information see the ADEQ - [Arizona Water Quality Assessment: 1998 - 305b Report & Arizona Provisional Water Quality Limited Waters List](#).

AIR QUALITY

The objective of the BLM's air resource program is to maintain or improve air quality within National Ambient Air Quality Standards (NAAQS), achieve State Implementation Plan (SIP) goals for non-attainment areas, reduce emissions from point/non-point sources, and improve BLM's ability to understand and predict the effects of changing climatic regimes and atmospheric conditions that may cause ecological changes in climate-stressed environments.

Open Areas, Dry Washes, and River Beds: The control of airborne dust from open areas, dry washes and river beds is addressed in Arizona Rules and Regulations for Air Pollution Control - R9-3-404 A-C.

Roadways and Streets: Regulation, R9-3-405 A prohibits the use, repair, building, or rebuilding of roadways without taking reasonable dust abatement measures.

Mineral Tailings: R9-3-408 addresses prohibition on permitting or allowing construction of mineral tailings piles.

Fire Management: R9-3-402 and 403 direct BLM to follow permitting procedures before conducting any prescribed burning projects, to ensure that smoke from fires does not degrade air quality. Section 118 of the Clean Air Act (49.501 of the Arizona Laws Relating to Environmental Quality) charges the Arizona

Department of Environmental Quality to protect the health and welfare of Arizona residents from adverse impacts of air pollution. Those wishing to conduct prescribed burns must contact the Arizona Department of Environmental Quality.

VEGETATION MANAGEMENT

The Federal Land Policy and Management Act mandates BLM to manage vegetation resources under the principles of multiple use and sustained yield to maintain or improve biological diversity. This planning effort has categorized lands supporting native vegetation communities into two distinct types: (1) rangelands and (2) riparian areas and wetlands.

Rangeland Resources

BLM manages its grazing program under provisions of the Taylor Grazing Act of 1934, the Federal Land Policy and Management Act of 1976, and the Public Rangelands Improvement Act of 1978. These acts, along with Title 43, Code of Federal Regulations Part 4100 and associated BLM manual policy, authorize the following:

- Issuance of grazing permits and leases.
- Detection and abatement of unauthorized use.
- Use supervision.
- Livestock grazing management.
- Range improvement facilities and treatments.

Management of rangelands in the planning area is guided by the Phoenix Resource Management Plan (BLM 1988), the Eastern Arizona Grazing EIS (BLM 1986) and the associated Rangeland Program Summary to the Grazing EIS (BLM 1987b). The Eastern Arizona Grazing EIS provides regulations for managing rangelands and for the livestock grazing program through the following objectives:

- Restore and improve rangeland condition and productivity.
- Provide for use and development of rangeland.
- Maintain and improve habitat and viable wildlife populations.
- Control future management actions.
- Promote sustained yield and multiple use.

Riparian and Wetland Resources

Legal authority for BLM's management of riparian-wetland areas is based on many laws and executive orders, including the following:

- Taylor Grazing Act of 1934.
- Endangered Species Act of 1973.
- Federal Land and Policy Management Act of 1976.
- Emergency Wetland Resources Act of 1986.
- Water Quality Act of 1987.

- Executive Order 11988 (Floodplain Management).
- Executive Order 11990 (Protection of Wetlands).

On January 22, 1987, BLM issued its riparian area management policy, which defined the term riparian area, set management objectives, and outlined specific policy direction. This policy is the basis for BLM Manual 1737 (Riparian-Wetland Area Management), the Bureau-wide Riparian-Wetland Initiative for the 1990's, and the Arizona Riparian-Wetland Area Management Strategy. Riparian management plans will be consistent to the extent practicable, with State of Arizona riparian habitat, protection policy, "Protection of the Riparian Areas" February 14, 1991 (Executive Order 91-6).

Invasive Species

Executive Order 13112 directs federal agencies to prevent the introduction and spread of invasive species; detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; monitor invasive species populations accurately and reliably; provide for restoration of native species and habitat conditions in ecosystems that have been invaded; conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species and promote public education on invasive species and the means to address them.

FISH AND WILDLIFE MANAGEMENT

Legislation, including the Federal Land Policy and Management Act, the Endangered Species Act, Public Rangelands Improvement Act, and the Sikes Act, directs BLM to manage habitats to meet the needs of fish and wildlife.

The Endangered Species Act of 1973 is the authority for conserving endangered and threatened species on public lands. Section 4(f) of this act directs the Secretary of the Interior to develop and implement recovery plans for the conservation and survival of endangered species. Section 7(a)(1) requires each federal agency to carry out proactive measures to recover listed species. Section 7(a)(2) requires each agency to avoid jeopardizing the existence of listed species through its actions.

BLM Manual 6840 does the following:

- Outlines the conservation of threatened and endangered species and the habitat on which they depend.
- Ensures that all actions that BLM authorizes, funds, or implements comply with the Endangered Species Act.
- Requires cooperation with the U.S. Fish and Wildlife Service in the planning and recovery of threatened and endangered species.
- States BLM's policy for special status ~~candidate~~ species.

BLM will use collaborative information and services from state agencies, federal agencies, universities, conservation groups, and organizations for proposals, the implementing of wildlife improvements, or any other wildlife management action. This plan amendment meets Sikes Act (1974) requirements for a wildlife habitat management plan. Section 205 of the National Environmental Policy Act requires interdisciplinary consultation.

CULTURAL RESOURCES

The BLM administers cultural resources according to mandates set forth by a number of regulations, laws and acts, including the Federal Land Policy and Management Act (FLPMA) of 1976, the National Historic Preservation Act (NHPA) of 1966, and the Archaeological Resources Protection Act (ARPA) of 1979.

In Arizona, the BLM also operates under the terms of a national Programmatic Agreement (PA) and a Protocol with the Arizona State Historic Preservation Officer (SHPO). This Protocol guides inventory, data recovery and impact mitigation procedures for cultural resources eligible for listing or listed on the National Register of Historic Places that are affected by BLM undertakings and actions.

The National Historic Preservation Act requires the BLM to inventory and preserve significant cultural properties located on land under its administration. In compliance with this legislation, the BLM's cultural resource management program at the field office level provides for: 1) collection and assimilation of information about the nature of the cultural resources known and expected to occur within the field area, 2) assessment of cultural resource use potentials, 3) assignment of resource uses, 4) planned steps to protect or realize assigned uses, and 5) authorization of appropriate uses.

To comply with the National Historic Preservation Act, activities that may affect properties listed on or eligible for the National Register of Historic Places are evaluated and potential impacts analyzed and mitigated under the terms of BLM's national cultural resources Programmatic Agreement and Arizona Protocol.

The Archaeological Resources Protection Act does the following:

- Prohibits the attempt or excavation, removal, damage, or trafficking of archaeological resources from public land by unauthorized persons.
- Provides for the authorized removal and excavation of cultural resources through a permitting process.
- Requires the Secretary of the Interior to prepare plans to determine the nature and extent of archaeological resources and to schedule land surveys in areas likely to contain the most scientifically valuable archaeological resources.

Native American Consultation

BLM must consult with Native Americans while preparing planning documents such as RMPs to meet its responsibilities under the following:

- Federal Land Policy and Management Act National Environmental Policy Act.
- American Indian Religious Freedom Act.
- Executive Order 13007.

These responsibilities require BLM to inform tribal officials and representatives of opportunities to comment on and participate in developing BLM use plans, specifically (1) requesting their views, (2) asking which people such as tribal leaders or religious practitioners it should contact, and (3) making a good faith effort to pursue those contacts and elicit Native American interests and concerns.

LIVESTOCK GRAZING

Actions pertaining to livestock grazing management conform to the Eastern Arizona Grazing EIS (BLM 1986), provisions of the Taylor Grazing Act of 1934, and the Public Rangeland Improvement Act of 1978. All proposed grazing and rangeland improvement practices conform to the Best Management Practices developed by the Arizona Department of Environmental Quality for livestock grazing. BLM administers livestock grazing under the 43 CFR 4000 regulations consistent with achieving land use plan objectives.

MINERAL MANAGEMENT

Overall guidance on managing mineral resources appears in the following:

- General Mining Law of 1872, as amended.
- Mining and Minerals Policy Act of 1970.
- Sec. 102 (a)(12) of the Federal Land Policy and Management Act.
- National Materials and Minerals Policy, Research and Development Act of 1980.
- State of Arizona statutes and rules.
- BLM's Mineral Resources Policy of 1984.

Section ~~3809.2-2~~ **3809.42(b)** of Title 43 Code of Federal Regulations covers concerns for air, water, and solid waste. This regulation requires all operators to comply with state pollution control standards.

Locatable Minerals: Development of locatable minerals is regulated by BLM's Surface Management Regulations at 43 CFR 3809. The 3809 regulations require mineral exploration and development under the mining laws to prevent unnecessary or undue degradation of other resources. Mining activities will be evaluated on a case-by-case basis during the life of this plan.

Saleable Minerals: The Mineral Act of 1947 and 43 CFR 3600 provide for the disposal and regulation of mineral materials. BLM will administer the sales of mineral materials to the public on a case-by-case basis.

Leasable Minerals: The Mineral Leasing Act of 1920, Geothermal Steam Act of 1970, and 43 CFR 3100 to 3500 provide the regulatory framework for issuing mineral leases. BLM attaches stipulations to leases to protect natural and cultural resources in a lease area.

HAZARDOUS MATERIALS

BLM manages hazardous materials in compliance with the following statutes:

- Resource Conservation and Recovery Act (RCRA), or Public Law 94-580.
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or Public Law 96-510, also known as the Superfund Act.
- Superfund Amendment Reauthorization Act (SARA) Title III (E.O. 12580).

BLM responsibilities under these acts include conformance with federal RCRA enforcement regulations pertaining to the storage, handling, and disposal of hazardous materials and ~~reporting unpermitted hazardous~~

material discharges and responding to releases of hazardous substances under the provisions of CERCLA. The BLM Tucson Field Office hazardous materials specialist and law enforcement will coordinate environmental conditions such as spills or illegal dumping and initiate the proper response.

LAND TENURE AND LAND USE AUTHORIZATIONS

The Land Tenure Amendment to the Safford District Resource Management Plan (BLM 1994c) made land tenure decisions for the Empire-Cienega Planning Area while the planning area was administered by the BLM Safford District. The Empire-Cienega Long Term Management Area was one of 24 long term management areas (LTMA) delineated in the Land Tenure Plan Amendment. The boundaries of the Empire-Cienega LTMA correspond to the current planning area boundary. In managing all 24 LTMA BLM will do the following:

- Intensively manage the public lands for their multiple resource values as defined in the Federal Land Policy and Management Act.
- Retain all public land (surface and subsurface estate) and possibly seek to acquire state and private lands within these areas.
- Consider land acquisitions on a case-by-case basis and consider economic impacts as well as natural resource impacts.

BLM may acquire land by exchange or purchase, considering four alternatives for private lands acquisitions:

- Land owner education.
- Entering into cooperative management agreements.
- Partial acquisition such as conservation easements.
- Full “fee simple title” acquisition.

The following are objectives for land acquisition within LTMA:

- Acquire lands with high public values that compliment existing management programs within long term management areas.
- Consolidate ownership patterns within LTMA to improve management efficiency.
- Improve service to the public.

Lands considered for acquisition will have one or more of the following characteristics:

- Riparian habitat.
- Watersheds of important riparian areas.
- High-value wildlife habitat, including critical habitat for threatened and endangered species and major migration corridors.
- Suitability for an administrative site.
- Suitability for developed recreation sites.
- Access to public lands.
- Significant cultural and paleontological properties.
- Other high public resources, such as inholdings in areas of critical environmental concern and other types of special management areas.

Land Use Authorizations: BLM will continue to issue land use authorizations on a case-by-case basis and in accordance with the approved resource management plan. BLM will issue rights-of-way within existing right-of-way routes, including joint use whenever possible.

OUTDOOR RECREATION

The BLM recognizes the importance of quality outdoor recreation experiences to local economies, as well as to the health and well-being of society and the enjoyment of our visitors. The BLM is committed to managing and protecting the NCA so that the areas and activities which are most important to visitors are still available for years to come.

The Land and Water Conservation Fund Act of 1965 is the main authority that assures accessibility to outdoor recreation resources. This act serves as the basis for the objectives of the BLM recreation program:

- Provide quality outdoor recreation opportunities and experiences.
- Protect visitor health and safety and natural and cultural resources.
- Provide universally accessible facilities.
- Resolve user conflicts.

BLM has determined that segments of Cienega Creek are suitable for inclusion in the Wild and Scenic Rivers System and must be managed by the guidelines of the Wild and Scenic Rivers Act of 1968 during the interim and upon designation by Congress. This act selects certain rivers of the Nation having remarkable values, preserves them in a free-flowing condition, and protects their local environments for the "... benefit and enjoyment of present and future generations."

Commercial recreation uses, special events, and group activities will have to apply for special recreation permits. BLM considers these applications on a case-by-case basis and addresses them under Title 43 CFR, Sub-part 8372 (Special Recreation Permits, Other than on Developed Recreation Site). Other criteria applied to the permits come from the NEPA guidelines. These criteria ensure consistency with management objectives such as the following:

- Suitability.
- Mitigation of potential ground disturbance.
- Amount of traffic generated by the permit.
- Conflict with other uses.

2. BLM STANDARDS AND GUIDELINES FOR ACHIEVING RANGELAND HEALTH

BLM Standards and Guidelines for Achieving Rangeland Health

The goals, objectives, and actions presented in this plan are intended to meet or exceed the standards required in the Bureau's Standards and Guidelines for Rangeland Health in Arizona. These standards and guidelines were developed in consultation with Resource Advisory Council and others. The Arizona standards and guidelines meet the requirements and intent of 43 Code of Federal Regulations, Subpart 4180 (Rangeland Health). These standards and guidelines are intended to provide a clear statement of agency policy and direction for those who use public lands, and for those who are responsible for their management and accountable for their condition.

The Fundamentals of Rangeland Health stated in 43 CFR 4180 are:

1. Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity and the timing and duration of flow.
2. Ecological processes, including the hydrologic cycle, nutrient cycle and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.
3. Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established Bureau of Land Management objectives such as meeting wildlife needs.
4. Habitats are, or are making significant progress toward being, restored or maintained for federal threatened and endangered species, federal Proposed, Category 1 and 2, federal candidate and other special status species.

The fundamentals of rangeland health combine the basic precepts of physical function and biological health with elements of law relating to water quality, and plant and animal populations and communities. They provide the direction for the development of resource objectives and the selection of appropriate management actions to achieve them.

ARIZONA STANDARDS AND GUIDELINES

Arizona Standards and Guidelines (S&G) for grazing administration have been developed through a collaborative process involving the Bureau of Land Management State S&G Team and the Arizona Resource Advisory Council. Together, through meetings, conference calls, correspondence, and Open Houses with the public, the BLM State Team and RAC prepared Standards and Guidelines to address the minimum requirements outlined in the grazing regulations. The Standards and Guidelines, criteria for

meeting Standards, and indicators are an integrated document that conforms to the fundamentals of rangeland health and the requirements of the regulations when taken as a whole.

Upland sites, riparian-wetland areas, and desired resource conditions are each addressed by a standard and associated guidelines.

Standard 1: Upland Sites

Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

Criteria for meeting Standard 1:

Soil conditions support proper functioning of hydrologic, energy, and nutrient cycles. Many factors interact to maintain stable soils and healthy soil conditions, including appropriate amounts of vegetative cover, litter, and soil porosity and organic matter. Under proper functioning conditions, rates of soil loss and infiltration are consistent with the potential of the site.

Ground cover in the form of plants, litter or rock is present in pattern, kind, and amount sufficient to prevent accelerated erosion for the ecological site; or ground cover is increasing as determined by monitoring over an established period of time.

Signs of accelerated erosion are minimal or diminishing for the ecological site as determined by monitoring over an established period of time.

As indicated by such factors as:

- Ground Cover
 - litter
 - live vegetation, amount and type (e.g., grass, shrubs, trees, etc.)
 - rock
- Signs of erosion
 - flow pattern
 - gullies
 - rills
 - plant pedestaling

Exceptions and exemptions (where applicable):

- None

Guidelines:

1-1. Management activities will maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological sites within management units. The ground cover should maintain soil organisms and plants and animals to support

the hydrologic and nutrient cycles, and energy flow. Ground cover and signs of erosion are surrogate measures for hydrologic and nutrient cycles and energy flow.

1-2. When grazing practices alone are not likely to restore areas of low infiltration or permeability, land management treatments may be designed and implemented to attain improvement.

Standard 2: Riparian-Wetland Sites

Riparian-wetland areas are in properly functioning condition.

Criteria for meeting Standard 2:

Stream channel morphology and functions are appropriate for proper functioning condition for existing climate, landform, and channel reach characteristics. Riparian-wetland areas are functioning properly when adequate vegetation, land form, or large woody debris is present to dissipate stream energy associated with high water flows.

Riparian-wetland functioning condition assessments are based on examination of hydrologic, vegetative, soil and erosion-deposition factors. BLM has developed a standard checklist to address these factors and make functional assessments. Riparian-wetland areas are functioning properly as indicated by the results of the application of the appropriate checklist.

The checklist for riparian areas is in Technical Reference 1737-9 "Process for Assessing Proper Functioning Condition." The checklist for wetlands is in Technical Reference 1737-11 "Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas." These checklists are reprinted on the pages following the Guidelines for Standard 3.

As indicated by such factors as:

- Gradient
- Width/depth ratio
- Channel roughness and sinuosity of stream channel
- Bank stabilization
- Reduced erosion
- Captured sediment
- Ground-water recharge
- Dissipation of energy by vegetation

Exceptions and exemptions (where applicable):

- Dirt tanks, wells, and other water facilities constructed or placed at a location for the purpose of providing water for livestock and/or wildlife and which have not been determined through local planning efforts to provide for riparian or wetland habitat are exempt.
- Water impoundments permitted for construction, mining, or other similar activities are exempt.

Guidelines:

2-1. Management practices maintain or promote sufficient vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability, thus promoting stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform.

2-2. New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions.

2-3. The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect ecological functions and processes.

Standard 3: Desired Resource Conditions

Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

Criteria for meeting Standard 3:

Upland and riparian-wetland plant communities meet desired plant community objectives. Plant community objectives are determined with consideration for all multiple uses. Objectives also address native species, and the requirements of the Taylor Grazing Act, Federal Land Policy and Management Act, Endangered Species Act, Clean Water Act, and appropriate laws, regulations, and policies.

Desired plant community objectives will be developed to assure that soil conditions and ecosystem function described in Standards 1 and 2 are met. They detail a site-specific plant community, which when obtained, will assure rangeland health, State water quality standards, and habitat for endangered, threatened, and sensitive species. Thus, desired plant community objectives will be used as an indicator of ecosystem function and rangeland health.

As indicated by such factors as:

- Composition
- Structure
- Distribution

Exceptions and exemptions (where applicable):

- Ecological sites or stream reaches on which a change in existing vegetation is physically, biologically, or economically impractical.

Guidelines:

3-1. The use and perpetuation of native species will be emphasized. However, when restoring or rehabilitating disturbed or degraded rangelands, non-intrusive, non-native plant species are appropriate for use where native species (a) are not available, (b) are not economically feasible, (c) cannot achieve ecological objectives as well as non-native species, and/or (d) cannot compete with already established non-native species.

3-2. Conservation of Federal threatened or endangered, proposed, candidate, and other special status species is promoted by the maintenance or restoration of their habitats.

3-3. Management practices maintain, restore, or enhance water quality in conformance with State or Federal standards.

3-4. Intensity, season and frequency of use, and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives.

3-5. Grazing on designated ephemeral (annual and perennial) rangeland may be authorized if the following conditions are met:

- ephemeral vegetation is present in draws, washes, and under shrubs and has grown to useable levels at the time grazing begins;
- sufficient surface and subsurface soil moisture exists for continued plant growth;
- serviceable waters are capable of providing for proper grazing distribution;
- sufficient annual vegetation will remain on site to satisfy other resource concerns, (i.e., watershed, wildlife, wild horses and burros); and
- monitoring is conducted during grazing to determine if objectives are being met.

3-6. Management practices will target those populations of noxious weeds which can be controlled or eliminated by approved methods.

3-7. Management practices to achieve desired plant communities will consider protection and conservation of known cultural resources, including historical sites, and prehistoric sites and plants of significance to Native American peoples.

3. RIPARIAN PROPER FUNCTIONING CONDITION ASSESSMENTS

Name of Riparian-Wetland Area (**Lotic Area**): _____

Date: _____ Area/Segment ID: _____ Miles: _____

ID Team Observers: _____

Yes	No	N/A	HYDROLOGIC
			1) Floodplain inundated in "relatively frequent" events (1-3 years)
			2) Active/stable beaver dams
			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
			4) Riparian zone is widening or has achieved potential extent
			5) Upland watershed not contributing to riparian degradation

Yes	No	N/A	VEGETATIVE
			6) Diverse age-class distribution (recruitment for maintenance/recovery)
			7) Diverse composition of vegetation (for maintenance/recovery)
			8) Species present indicate maintenance or riparian soil moisture characteristics
			9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high streamflow events
			10) Riparian plants exhibit high vigor
			11) Adequate vegetative cover present to protect banks and dissipate energy during high flows
			12) Plant communities in the riparian area are an adequate source of coarse and/or large woody debris

Yes	No	N/A	EROSION DEPOSITION
			13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody debris) adequate to dissipate energy
			14) Point bars are revegetating
			15) Lateral stream movement is associated with natural sinuosity
			16) System is vertically stable
			17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

(Revised 1995)
Appendix 1-11

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.

Functional Rating:

Trend for Functional--At Risk:

Are factors contributing to unacceptable conditions outside BLM's control or management?

If yes, what are those factors?

A2-17

Name of Riparian-Wetland Area (**Lentic Area**): _____

Date: _____ Area/Segment ID: _____ Acres: _____

ID Team Observers: _____

Yes	No	N/A	HYDROLOGIC	
			1)	Riparian-wetland area is saturated at or near the surface or inundated in "relatively frequent" events (1-3 years)
			2)	Fluctuation of water levels is not excessive
			3)	Riparian-wetland zone is enlarging or has achieved potential extent
			4)	Upland watershed not contributing to riparian-wetland degradation
			5)	Water quality is sufficient to support riparian-wetland plants
			6)	Natural surface or subsurface flow patterns are not altered by disturbance (i.e., hoof action, dams, dikes, trails, roads, rills, gullies, drilling activities)
			7)	Structure accommodates safe passage of flows (e.g., no headcut effecting dam or spillway)

Yes	No	N/A	VEGETATION	
			8)	Diverse age-class distribution (recruitment for maintenance/recovery)
			9)	Diverse composition of vegetation (for maintenance/recovery)
			10)	Species present indicate maintenance of riparian-wetland soil moisture characteristics
			11)	Vegetation is comprised of those plants or plant communities that have root masses capable of withstanding wind events, wave flow events, or overland flows (e.g., storm events, snowmelt)
			12)	Riparian-wetland plants exhibit high vigor
			13)	Adequate vegetative cover present to protect shorelines/soil surface and dissipate energy during high wind and wave events or overland flows
			14)	Frost or abnormal hydrologic heaving is not present
			15)	Favorable microsite condition (i.e., woody debris, water temperature, etc.) is maintained by adjacent site characteristics

4. CULTURAL RESOURCE USE CATEGORIES

CULTURAL RESOURCE MANAGEMENT USE CATEGORIES

The BLM manages cultural resources for their information potential, their public and traditional uses, and to conserve their values for the future.

Use Categories

The BLM management system requires field offices to allocate cultural properties known and projected to occur in a planning area to appropriate use categories. Use categories establish what cultural resources and values need to be protected, and when or how use should be authorized. Cultural resources can be used in a variety of ways, including research, traditional or ceremonial purposes, interpretive exhibits, educational field schools, experimental studies, and as resources “banks” to be conserved for future use.

Ideally, allocations are made in regional plans, local interdisciplinary plans, or project plans. When allocations have not been made in other planning decisions they should be made during the compliance process for land use authorizations. Allocation of use categories should be consistent with historic context documents and State Historic Preservation Plans. These categories are: 1) Scientific Use, 2) Conservation for Future Use, 3) Traditional Use, 4) Public Use, 5) Experimental Use, and, 6) Discharged from Management.

1. Scientific Use. This category applies to any cultural property determined to be available for consideration as the subject of scientific or historical study at the present time, using currently available research techniques. Study includes methods that would result in the property's physical alteration or destruction. This category applies almost entirely to prehistoric and historic archaeological properties, where the method of use is generally archaeological excavation, controlled surface collection and/or controlled, systematic data recovery.

2. Conservation for Future Use. Allocation to this category is reserved for any unusual cultural property which, because of scarcity, a research potential that surpasses the current state of the art, singular historic importance, cultural importance, architectural interest, or comparable reasons, is not currently available for consideration as the subject of scientific or historical study that would result in its physical alteration. A cultural property included in this category is deemed worthy of segregation from all other land or resource uses, including cultural resource uses, that would threaten the maintenance of its present condition or setting, as pertinent, and will remain in this use category until specified provisions are met in the future.

3. Traditional Use. A cultural resource known to be perceived by a specified social and/or cultural group as important in maintaining the cultural identity, heritage, or well-being of the group may be allocated to this use. Cultural properties assigned to this category are to be managed in ways that recognize the importance ascribed to them and seek to accommodate their continuing traditional use.

4. Public Use. A cultural property found to be appropriate for use as an interpretive exhibit in place, or for related educational and recreational uses by members of the general public may be allocated for

public use. This category may also include buildings suitable for continued use or adaptive use, for example as staff housing or administrative facilities at a visitor contact or interpretive site.

5. Experimental Use. This category may be applied to a cultural property judged well-suited for controlled experimental study, to be conducted by BLM or others concerned with the techniques of managing cultural properties, which would result in the property's alteration, possibly including loss of integrity and destruction of physical elements. Committing cultural properties or the data they contain to loss must be justified in terms of specific information that would be gained and how it would aid in the management of other cultural properties. **Cultural properties with strong research potential, traditional cultural importance, or good public use potential are not assigned to this category.**

6. Discharged From Management. Cultural properties that have no remaining identifiable use are assigned to this category. Most often this category involves prehistoric and historic archaeological properties, such as small surface scatters or artifacts or debris, whose limited research potential is effectively exhausted as soon as they have been documented. Also, more complex archaeological properties that have had their salient information collected and preserved through mitigation or research may be discharged from management, as should cultural properties destroyed by any natural event or human activity. Properties discharged from management remain in the inventory, but are removed from further management attention and do not constrain other land uses. Particular classes of unrecorded cultural properties may be named and described in advance as dischargeable upon documentation, but specific cultural properties must be inspected in the field and recorded before they may be discharged from management.

CULTURAL RESOURCE USE CATEGORIES AND NATIONAL REGISTER SIGNIFICANCE

Cultural resource use categories are based in part upon requirements stated in the National Historic Preservation Act. This legislation requires the BLM to assess cultural properties to determine their historic significance, integrity and potential for listing on the National Register of Historic Places, and identify possible effects that any undertakings might have on cultural properties eligible for listing or listed on the National Register.

To be considered eligible for listing on the National Register a property must meet three broad qualifications: 1) Generally, it must be at least fifty (50) years old, 2) it must have significance, or embody recognizable importance and, 3) it must retain historic integrity.

A property may embody one or more of several different types of values which represent the importance of a property and imply the reason that it should be preserved. These values are classified under the four National Register Criteria for Evaluation:

Criterion A: Event. Properties can be eligible for the National Register if they are associated with events that have made a significant contribution to the broad patterns of our history.

Criterion B: Person. Properties may be eligible for listing on the National Register if they are associated with the lives of persons significant in our past.

Criterion C: Design/Construction. Properties may be eligible for the National Register if they embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Criterion D: Information Potential. Properties may be eligible for the National Register if they have yielded, or may be likely to yield, information important in prehistory or history.

CULTURAL RESOURCE USE CATEGORIES- LAS CIENEGAS RESOURCE MANAGEMENT PLAN

Cultural Resources Allocated to Public Use

Empire Ranch Headquarters

The land use proposals and implementation plans for cultural resources presented in Chapter 2 include allocation of the historically significant buildings at the Empire Ranch Headquarters to Public Use under all alternatives. If feasible, selected sites or properties outside the headquarters area could be allocated to Public Use in the future under Alternatives 2 and 3, but only if funds and staff are available to ensure that no adverse impacts would occur from such use.

Properties allocated to Public Use may be used as in-place interpretive exhibits, for related educational and recreational uses by members of the general public, and for continued or adaptive use such as staff housing, or administrative facilities at a visitor contact or interpretive site.

Cultural Properties Outside the Empire Ranch Headquarters

Archaeologists understand very little about the origin, technology, lifestyle and day-to-day activities of the prehistoric people who lived in what is now the planning area. Much of what is understood is based on archaeological materials recovered from two sites in the Cienega Valley that were excavated during the 1950's and 1980's. Since 1988, when the BLM acquired the land making up the planning area, Class III cultural resource inventories have slowly added information to the data base. Similarly, historical information about the planning area is being gradually accumulated.

In the future, as more information is collected, analyzed and available for use in constructing management strategies, sites of various types and ages could be selected and developed for interpreting educational information to the public about the prehistoric and historic people who inhabited the planning area. Provisions could be made to allocate some properties from Scientific Use to Public Use. Interpretation could range from merely placing interpretive panels or kiosks near or at selected sites to developing specific properties for visitation by the public. Such development could include interpretive trails, displays, signs and guided tours. When needed, archaeological efforts at the sites could be designed to include participation of volunteers working under the guidance of professional archaeologists. The object would be to provide information to the general public, and educational opportunities to lay people who wish to be actively involved in archaeology.

Cultural Resources Allocated to Scientific Use

The land use proposals and implementation plans for cultural resources presented in Chapter 2 provide for allocation of the Matty Canyon site complex, Sandford Homestead site and the Pump Canyon site to Scientific Use under Alternatives 2, 3, and 4. Under this use, these properties would be available for scientific and historical study by qualified researchers and scholars. Scientific study of these sites could include archaeological excavation, controlled surface collection, or some type of controlled systematic data recovery. All such data collection would require submission of detailed research proposals conforming to Federal and State standards and requirements. Individual project efforts would be designed to disturb only a small portion of a respective site, leaving undisturbed materials for future study.

As information is compiled through future cultural resource surveys and study of currently documented sites, additional properties may be allocated to Scientific Use.

Cultural Resources Allocated to Traditional Use

Representatives of the Tohono O'odham Nation, San Carlos Apache Tribe, and the Hopi Tribe have stated their interests in noncommercial collection of bear grass, cottonwood root, acorns and several species of medicinal/ceremonial herbs. Collection of these plants and materials would be carried out in a manner that would not kill individual plants or deplete individual populations.

Cultural Resources Allocated to Experimental Use or Discharged from Management

As data are collected and added to the existing body of information about the cultural resources in the planning area, some properties may be allocated for future conservation, experimental use or discharged from management.

CULTURAL RESOURCE USE CATEGORIES AND CORRESPONDING MANAGEMENT OBJECTIVES

Cultural resource management objectives are established through consideration of use categories and may be defined in a regional land use plan, a local land use plan, or a Cultural Resource Project Plan (CRPP). A CRPP documents the type, significance, eligibility status, preservation and protection needs and the uses prescribed for a particular site or group of sites.

A Historic Structures Report (HSR) was written by the National Park Service, under a contract by the BLM, for the Empire Ranch House and the Ranch Hand's House. The Empire Ranch House is listed on the National Register of Historic Places and the surrounding historic buildings are considered eligible for listing. These HSR's provide preservation prescriptions for both structures and are being used as guides for stabilization/preservation currently underway through an agreement between the BLM and Empire Ranch Foundation. This work is being done to meet preservation requirements mandated by the National Historic Preservation Act. A CRPP has been written for the Empire Ranch House. CRPP's will be written for the other historic buildings at the ranch headquarters as well as other selected cultural resources in the planning area.

5. VISUAL RESOURCE MANAGEMENT CLASS OBJECTIVES

Bureau Manual 8410, Visual Resource Inventory (BLM 1986), places the management of visual resources (scenic values) into four management classes.

Class 1 - The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes but does not preclude very limited management activity. The level of change of the characteristic landscape should be very low and must not attract attention.

Class 2 - The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class 3 - The objective of this class is to partially retain the existing character of the landscape. The level of activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class 4 - The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. Every attempt should be made, however, to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.

6. AREAS OF CRITICAL ENVIRONMENTAL CONCERN EVALUATIONS

ACEC nominations were submitted to BLM for Cienega Creek by the Nature Conservancy, the Arizona Game and Fish Department, and Jeff Williamson. The Cienega Creek proposals were modified through the Sonoita Valley Planning Process into two alternatives. The first alternative is the Empire-Cienega ACEC, which includes all public lands within the Empire-Cienega Planning Area except for the public lands now within the Appleton-Whittell ACEC. The Appleton-Whittell would remain a separate ACEC. The second alternative is the Cienega Creek ACEC, which includes a smaller area of public lands surrounding the perennial length of Cienega Creek. An additional proposal for an ACEC including Nogales and Little Nogales Springs was also evaluated. The Empire-Cienega ACEC proposal has been included in Planning Alternatives 2 and 4 and the Cienega Creek ACEC and Nogales Springs ACEC proposals have been included in Planning Alternative 3.

EMPIRE-CIENEGA ACEC (ALTERNATIVES 2 AND 4)

The Empire-Cienega Planning Area appears to meet the importance and relevance criteria needed to become eligible as an Area of Critical Environmental Concern. The proposed Empire-Cienega ACEC includes all public lands within the Empire-Cienega Planning Boundary (Map 2-10) with the exception of public lands currently within the Appleton-Whittell ACEC (the Research Ranch). The proposed Empire-Cienega ACEC includes the entire perennial portion of Cienega Creek, perennial segments of Empire Gulch, Gardner Canyon, Mattie Canyon, and numerous perennial springs including Nogales and Little Nogales Springs. Also included are some outstanding examples of rare mesquite bosque, sacaton grasslands, and desert grasslands.

Relevance. The proposed Empire-Cienega ACEC includes a variety of unique and rare vegetative communities including cottonwood-willow riparian areas, cienegas, mesquite bosques, sacaton grasslands, desert grasslands, and oak woodlands. These communities support a diverse assemblage of plants and animals, many of which are federally listed or identified as species of special concern.

Cienega Creek is the main drainage of the proposed Empire-Cienega ACEC. The 20+ mile riparian zone supports a variety of obligate species, including several federally listed species and many species proposed for state species of special concern.

Cienega Creek provides essential habitat for the Gila topminnow, a federal endangered and proposed state species of special concern. The creek is listed number one for protection by the desert fisheries recovery team and is designated as one of five critical habitats needed for the future survival of the Gila topminnow. The stream is one of the last in Arizona supporting an intact native fish fauna uncontaminated by exotic fish. Cienega Creek also provides habitat for the Gila chub, which is candidate for federal listing. Other special status species found along the creek that require riparian habitat include the Huachuca water umbel, Mexican garter snake, lowland leopard frog, Chiricahua leopard frog, yellow-billed cuckoo, and Southwest willow flycatcher. Sacaton grasslands along Cienega Creek support populations of the rare Botteri's sparrow. Special management is needed to protect and enhance the resources of Cienega Creek. A rigorous monitoring program for native fish populations is needed to

detect any threats to their survival, such as contamination of Cienega Creek by exotic fish. The number of residences and stock ponds in the watershed poses a constant threat of such contamination, and monitoring will allow for timely management actions should such a contamination occur.

The upland areas in the proposed Empire-Cienega ACEC are integral to the health of the watershed and to Cienega Creek and its tributaries. The desert grasslands are some of the finest examples of native grasslands and support populations of the rare grasshopper sparrow and Baird's sparrow as well as herds of pronghorn, mule deer, and white-tail deer. The semidesert grasslands include agave habitats, which provide foraging areas for the lesser long-nosed bat, a federal endangered species.

Soils on terraces adjacent to incised perennial reaches of Cienega Creek and intermittent incised drainages are unstable and represent a natural hazard. These soils have the potential to pipe (internally erode) and headcut. Soils that exhibit these characteristics are found as components in soil mapping units 16a and 27a. Both the soil piping and headcutting processes supply large amounts of sediment to the Cienega Creek system. These sediments may impact native fish habitats. Special Management is needed to reduce sediment from these areas and protect public safety.

Importance. The proposed Empire-Cienega ACEC includes five of the rarest habitat types in the American Southwest. The marsh communities found along Cienega Creek have national significance as some of the last, best examples of relatively intact cienegas. Until the late 1800's cienega communities were relatively common components of southwestern riparian systems. Over the last 100 years, the majority of cienegas have disappeared due to declining water tables, channel erosion, and conversion to agriculture (See Hendrickson and Minckley 1985, *Desert Plants* 6(3): 130-175). The cottonwood-willow riparian community along Cienega Creek and its tributaries is considered the rarest forest type in the United States based upon studies conducted by The Nature Conservancy. Special management is needed to ensure the perpetuation and protection of these wetlands. The sacaton-predominated native grassland occurs in the floodplains adjacent to the riparian areas and is one of the largest, intact tracts remaining in the Southwest, hosting many declining avian grassland species. Large mesquite bosques, a rare woodland community, also occur adjacent to the riparian areas of Cienega Creek. The upland areas include large expanses of high-quality native semi-desert grasslands.

The native fish habitats in the perennial flows of Cienega Creek are vulnerable to degradation from adverse land and water management practices. The loss of surface flows in Cienega Creek would jeopardize not only the populations of native fish, including the endangered Gila topminnow, but habitat for a variety of riparian-dependent wildlife species.

Both Chiricahua leopard frogs and lowland leopard frogs, species of special concern, have been found throughout the Cienega Creek watershed at several locations. The leopard frog complex is of special concern in Arizona due to documented reductions as a result of reduction in wetland habitats, air pollution, and predation by introduced bullfrogs.

The natural resource values of Cienega Creek are dependent on the continued surface flow of water in the creek. As residential and agricultural development occurs in Sonoita; competing demands for water may threaten the surface flow. The acquisition and monitoring of instream flow water rights is needed to protect the riparian community.

The Empire-Cienega Resource Conservation Area has recently been designated as a Continentally Important Bird Area by the American Bird Conservancy.

Unstable soils that pipe and headcut pose significant threat to human life and safety in areas where roads exist. The process of soil piping or internal erosion is characterized initially by cracks or depressions on the surface. These features evolve into large sinkholes, which can occur both at the surface or underground within the soil profile. In areas adjacent to incised channels, surface flows enter the soil through the soil, water moves laterally in the soil and exits into the incised channels. As this process occurs large sinkholes have the potential to form at the surface or within the soil. These sinkholes become a safety hazard when they form under existing roads. The soil material above these sinkholes may collapse due to vehicle use and natural processes.

Goals. Protect and enhance watershed, grassland, and threatened/endangered wildlife resources, emphasizing total ecosystem management. Reduce the safety hazard caused by areas of unstable soils and reduce the amount of sediment production from these areas.

Objectives

1. Resolve non-federal land use conflicts.
2. Maintain adequate instream flows to support aquatic and riparian resources.
3. Maintain water quality to support aquatic, riparian and fish and wildlife values.
4. Maintain or improve riparian condition to meet objectives for *Proper functioning Condition (PFC)*, T/E fish and wildlife, including but not limited to a combination of maintenance of adequate woody species regeneration, promotion of mixed-aged stands of woody species, promotion of mature cottonwood overstory, and maintenance of cienega habitats.
5. Maintain or improve upland condition to meet objectives for proper functioning condition and desired future conditions of uplands **(maintain or improve ecological site similarity to potential natural community)**.
6. Minimize surface disturbance and erosion through adequate controls on recreational activities, livestock grazing and other human uses.
7. Educate the public regarding riparian and threatened/endangered wildlife issues and management needs.
8. Promote the recovery of the Gila Topminnow.
9. Increase stability in the soil piping and headcutting areas.
10. Maintain or improve water quality in the Cienega Creek system.
11. Stabilize incised channel banks within these unstable soil areas.
12. Reduce surface disturbance and vehicle use within these areas of soil piping and headcutting.
13. Increase public safety.
14. **Prevent the introduction of and control non-native invasive species in the ACEC.**

Management Prescriptions

1. Propose designation of about 49,000 acres of land as an ACEC.
2. Acquire non-federal lands within the ACEC boundaries and incorporate these acquired lands as part of the ACEC.
3. Acquire water rights including instream flow rights for Cienega Creek sufficient to support aquatic fish and wildlife resources and riparian and aquatic habitats..
4. Do not open ACEC to mineral entry and do not permit mineral material sales or surface occupancy for oil and gas leases within the ACEC.
5. Limit motorized vehicles to designated roads and close non-essential roads.
6. Minimize building of recreation and livestock developments in the 100- year flood plain. Limit developments to those that are needed to reduce impacts on riparian areas within the ACEC.

7. Limit livestock use in riparian areas of the ACEC except for crossing lanes, watering areas and specific areas where livestock grazing is identified and used as a management tool to achieve a riparian or aquatic related resource objective.
8. Implement a livestock grazing system consistent with the goals and objectives of the ACEC.
9. Prohibit recreational gold-panning, dredging, or sluicing within the ACEC.
10. Prohibit overnight camping within the riparian areas of the ACEC (defined as within 100 feet of the water's edge). Camping within the 100 year floodplain would be permitted if consistent with management prescriptions for the remainder of the planning area.
11. Limit crossings of Cienega Creek for group activities to dry crossings, established road/trail crossings, or at the designated crossings identified in Figure 2-2 (Alternative 2) and Figure 2-7 (Alternative 4).
12. Develop educational brochures and signs promoting public awareness of threatened and endangered fish and wildlife and riparian resources and their needs.
13. Introduce Gila topminnow from Cienega Creek into available habitats (as fully protected) to provide a refugia for the Cienega Creek population.
14. Include the ACEC in a right-of-way avoidance area. Access routes for maintenance of existing and future utility lines will not cross perennial reaches of Cienega Creek except at designated crossings.
15. Implement the Wood Canyon Watershed Activity Plan (BLM 1989) by doing the following:
 - Find and monitor sinkholes and headcutting areas.
 - Close to vehicular traffic areas that exhibit a high degree of soil piping and headcutting.
 - In these unstable areas relocate existing and future roads away from incised channels.
 - Reduce the amounts of overland flows reaching these unstable areas by diverting flows or increasing vegetative cover in adjacent areas.
 - Stabilize and rehabilitate shallow incised channels to reduce lateral flow by structural or vegetative methods.
 - Stabilize incised channel banks with increased riparian vegetation where possible.
 - Decrease the depth of intermittent incised channels through structural methods to retain sediments.
16. Coordinate with surrounding land owners and managers, including the Forest Service, Arizona State Land Department, and Pima and Santa Cruz Counties to maintain or improve linkages of undeveloped lands in the region.
17. Coordinate with the Forest Service through the Forest Plan Revision process to consider related designations such as research natural areas for adjacent lands such as the western Whetstone Mountains area.
18. Implement a vegetation treatment program to aid in restoration of biological resources and processes.

CIENEGA CREEK ACEC (ALTERNATIVE 3)

Cienega Creek appears to meet the importance and relevance criteria needed to become eligible as an area of critical environmental concern. The proposed Cienega Creek ACEC (Map 2-16) includes the entire perennial portion of Cienega Creek and perennial reaches of Gardner Canyon, Empire Gulch, and Mattie Canyon. Also included are mesquite bosque and sacaton grasslands adjacent to the riparian. The proposed ACEC is located in:

T18S R18E, Sections 6 and 7

T18S R17E Sections 12, 13, 14, 23, 24, 26, 27, 34, and 35

T19S R17E, Sections 2, 3, 9, 10, 11, 14, 15, 16, 21, 22, 23, 26, 27, 28, 29, 32, 34

T20S R17E, Sections 2, 3, 10, and 11

Relevance. Cienega Creek provides essential habitat for the Gila topminnow, a federal endangered and proposed state wildlife of special concern species. The creek is listed number one for protection by the Desert Fisheries Recovery Team and is designated as one of five critical habitats needed for the future survival of the Gila topminnow. The stream is one of the last in Arizona supporting an intact native fish fauna that is uncontaminated by exotic fish. Cienega Creek also provides habitat for the Gila chub, which is a candidate for federal listing. Other species of concern found along the creek that require riparian habitat include the Mexican garter snake, lowland leopard frog, yellow-billed cuckoo, and Southwest willow flycatcher.

Special management is needed to protect and enhance the resources of Cienega Creek. A rigorous monitoring program for native fish populations is needed to detect any threats to their survival such as contamination of Cienega Creek by exotic fishes. The number of residences and stock ponds in the watershed pose a constant threat of such contamination. Monitoring will allow for timely management actions should exotic fish contaminate Cienega Creek.

Soils on terraces adjacent to incised perennial reaches of Cienega Creek and intermittent incised drainages are unstable and represent a natural hazard. These soils have the potential to pipe (internally erode) and head cut. Soils with these characteristics are found as components in soil mapping units 16a and 27a. Both soil piping and headcutting supply large amounts of sediment to the Cienega Creek system. These sediments may degrade native fish habitats. Special management is needed to reduce sediment from these areas and protect public safety.

Importance. The proposed Empire-Cienega ACEC includes four of the rarest habitat types in the American Southwest. The marsh communities along Cienega Creek have national significance as some of the last, best examples of relatively intact cienegas. Until the late 1800s cienega communities were relatively common components of southwestern riparian systems. Over the last 100 years, most cienegas have disappeared due to declining water tables, channel erosion, and conversion to agriculture (See Hendrickson and Minckley 1984). The cottonwood-willow riparian community along Cienega Creek and its tributaries is considered the rarest forest type in the United States according to studies conducted by The Nature Conservancy. Special management is needed to ensure the perpetuation and protection of these wetlands. The sacaton-predominated native grassland grows in the floodplains next to the riparian areas. One of the largest, intact tracts remaining in the Southwest, this grassland hosts many declining avian grassland species. Large mesquite bosques, a rare woodland community, also grow next to the riparian areas of Cienega Creek.

The native fish habitats in the perennial flows of Cienega Creek are vulnerable to degradation from adverse land and water management practices. The loss of surface flows in Cienega Creek would jeopardize not only the populations of native fishes, including the endangered Gila topminnow, but habitat for a variety of riparian-dependent wildlife species.

Both Chiricahua leopard frogs and lowland leopard frogs, species of special concern, have been found throughout the Cienega Creek watershed at several locations. The leopard frog complex is of special concern in Arizona due to documented decline as a result of reduced wetland habitats, air pollution, and predation by introduced bullfrogs.

The natural resources of Cienega Creek depend on the creek's continued surface flow of water. As Sonoita undergoes residential and agricultural, competing demands for water may threaten the surface flow. Instream flow water rights must be acquired and monitored to protect the riparian community.

Unstable soils that pipe and head cut significantly threaten human life and safety in areas that have roads. The process of soil piping or internal erosion is characterized initially by cracks or depressions on the surface. These features evolve into large sinkholes, either at the surface or underground within the soil profile. In areas next to incised channels, surface flows soak into the soil, move sideways, and exit into the incised channels. Through this process large sinkholes can form at the surface or within the soil. These sinkholes become hazardous when they form under roads and soil material above them collapse due to vehicle use and natural processes.

Goal. Protect and enhance aquatic, riparian, and associated threatened and endangered wildlife species, emphasizing total ecosystem management.

Objectives

1. Resolve nonfederal land use conflicts.
2. Maintain adequate instream flows to support aquatic and riparian resources.
3. Maintain water quality to support aquatic, riparian, and fish and wildlife values.
4. Maintain or improve riparian condition to meet goals for proper functioning condition (*PFC*) and threatened and endangered fish and wildlife, including a combination of the following:
 - Maintaining adequate woody species regeneration.
 - Promoting mixed-aged stands of woody species.
 - Promoting mature cottonwood overstory.
 - Maintaining cienega habitats.
5. Minimize surface disturbance and erosion through adequate controls on recreational activities, livestock grazing, and other human uses.
6. Educate the public on riparian and threatened and endangered wildlife issues and management needs.
7. Promote the recovery of the Gila topminnow.
8. Increase stability in the soil piping and headcutting areas.
9. Maintain or improve water quality in the Cienega Creek system.
10. Stabilize incised channel banks within these unstable soil areas.
11. Reduce surface disturbance and vehicle use within these areas of soil piping and headcutting.
12. Increase public safety.

Management Prescriptions

1. Propose designation of 4,418 acres as an area of critical environmental concern (ACEC).
2. Acquire non-federal lands within the ACEC boundaries and incorporate acquired lands into the ACEC.
3. Acquire water rights including instream flow rights for Cienega Creek sufficient to support aquatic fish and wildlife resources and riparian and aquatic habitats. .
4. Keep the ACEC closed to mineral entry, and do not permit mineral material sales or surface occupancy for oil and gas leases within the ACEC.
5. Limit motorized vehicles to designated roads and close nonessential roads.
6. Minimize building of recreation and livestock developments in the 100-year floodplain. Limit developments to those needed to reduce impacts on riparian areas within the ACEC.
7. Limit livestock use in riparian areas of the ACEC except for crossing lanes, watering areas, and specific areas where livestock grazing is recognized and used as a management tool to achieve a riparian or aquatic-related resource objective.
8. Implement a livestock grazing system consistent with the ACEC's goals and objectives.
9. Prohibit recreational gold panning, dredging, or sluicing within the ACEC.

10. Prohibit camping within the riparian areas of the ACEC (defined as within 100 feet of the water's edge). Permit camping within the 100-year floodplain if consistent with management prescriptions for the remainder of the planning area.
11. Limit crossings of Cienega Creek for group activities to dry crossings, established road or trail crossings, or designated wet crossings shown in Figure 2-5.
12. Develop educational brochures and signs promoting public awareness of threatened/endangered fish and wildlife and riparian resources and their needs.
13. Introduce Gila topminnow from Cienega Creek into available habitats (as fully protected) to provide refugia for the Cienega Creek population.
14. Include the ACEC in a right-of-way avoidance area. Prohibit access routes for maintaining existing and future utility lines from crossing perennial reaches of Cienega Creek except at designated crossings.
15. Implement the existing Wood Canyon Watershed Activity Plan by doing the following:
 - Find and monitor sinkholes and headcutting areas.
 - Close areas that exhibit a high degree of soil piping and headcutting to vehicular traffic.
 - Relocate existing and future roads in these unstable areas away from incised channels.
 - Reduce the amounts of overland flows reaching these unstable areas by diverting flows and increasing vegetative cover in adjacent areas.
 - Stabilize and rehabilitate shallow incised channels to reduce lateral flow by structural or vegetative methods.
 - Stabilize incised channel banks with increased riparian vegetation where possible.
 - Decrease the depth of intermittent incised channels by structural methods to retain sediments.

Note: A proposal for a Cienega Creek Soil Piping and Headcutting ACEC was incorporated into the proposals for The Empire-Cienega ACEC and the Cienega Creek ACEC.

Nogales Springs ACEC (ALTERNATIVE 3)

The Nogales and Little Nogales springs area appears to meet the importance and relevance criteria needed to become eligible as an area of critical environmental concern. The proposed Nogales Springs ACEC (Map 2-16) includes the entire block of public land surrounding Nogales and Little Nogales springs. The proposed ACEC is located in area:

T17S R18E, Sections 22, 26, 27, 28, 34, and 35
T18S, R18E, Sections 2, 3, and 11

Relevance. Nogales and Little Nogales springs provide important refugia habitat for the Cienega Creek population of the Gila topminnow, a federally endangered species. This fish has been reintroduced at these springs, which still have potential to support a successful topminnow reintroduction. Other springs on State Trust Lands in the upper Wakefield Canyon drainage also have potential as topminnow reintroduction sites. The Desert Fisheries Recovery Team has listed the Cienega Creek population as number one for protection, and Cienega Creek has been designated as one of five critical habitats the future survival of the Gila topminnow. Nogales and Little Nogales springs also provide habitat for the lowland leopard frog, a former federal candidate species, which is on the Arizona Game and Fish Department's proposed list of Wildlife of Special Concern.

Special management is needed to protect and enhance the resources of Nogales and Little Nogales springs. Recreational activities and livestock grazing must be restricted to protect these resources.

Importance. The native fish and amphibian habitats dependent on the perennial flows of Nogales and Little Nogales Springs are vulnerable to degradation from adverse land and water management practices. The loss of surface flows in Nogales and Little Nogales springs would eliminate this site as a refugium for the Cienega Creek Gila topminnow population and would also cause a loss of habitat for a variety of riparian-dependent wildlife species.

The leopard frog complex is of special concern in Arizona due to documented declines as a result of reduced wetland habitats, air pollution, and predation by introduced bullfrogs.

The natural resource values of Nogales and Little Nogales springs depend on the continued surface flow of water at the springs. With residential and agricultural development in areas surrounding the planning area, competing demands for water may threaten the surface flow. Instream flow water rights need to be acquired and monitored to protect the riparian community. Nogales and Little Nogales springs support a mature riparian forest and diverse and abundant wildlife, including lowland leopard frogs. Mule deer, white-tail deer, and javelina frequent the area. The Nogales and Little Nogales springs complex is within the Empirita ranch. Special management is needed for this area to balance resource protection and needs of the livestock operation.

Travertine is being deposited at the springs. Their waters emerge from limestone, which provides a geologic environment suitable for forming travertine deposits. Travertine results from the precipitation of calcium carbonates from spring waters. The travertine deposits form ledges that can create dams and deep pools.

Goals. Protect and enhance the riparian and wildlife resources, emphasizing biological diversity and endangered species recovery. Protect the unique travertine geological processes and features.

Objectives

1. Maintain adequate flow at Nogales and Little Nogales springs to support aquatic and riparian resources.
2. Maintain water quality at Nogales and Little Nogales springs to support aquatic and riparian resources.
3. Maintain or improve riparian condition to meet goals for threatened and endangered wildlife, including maintaining adequate woody species regeneration and promoting mixed-aged stands of woody species.
4. Minimize surface disturbance and erosion by adequately controlling recreational activities, livestock grazing, and other human uses.
5. Promote the recovery of the Gila topminnow.
6. Protect the travertine features and travertine-forming processes from activities that would alter the natural cycle.

Management Prescriptions

1. Propose designating 411 acres of public land as an area of critical environmental concern (ACEC).
2. Maintain existing water rights and obtain enough instream flow water rights to Nogales and Little Nogales springs to support aquatic fish and wildlife and riparian and aquatic habitats.
3. Acquire nonfederal lands within the ACEC and incorporate these acquired lands as part of the ACEC.
4. Close the riparian areas within the ACEC to vehicular travel. Limit motorized vehicles to designated roads and close nonessential roads.

5. Keep the ACEC closed to mineral entry and do not permit mineral material sales or surface occupancy for oil and gas leases within the ACEC.
6. Minimize building of recreation and livestock developments in the 100- year floodplain. Limit developments to those needed to reduce impacts on riparian areas within the ACEC.
7. Limit livestock use in riparian areas of the ACEC except for crossing lanes, watering areas, and areas where livestock grazing is recognized and used as a management tool to achieve a riparian or aquatic-related resource objective.
8. Implement a livestock grazing system consistent with the goals and objectives of the ACEC, including building of fencing and waters needed under (7).
9. Prohibit recreational gold panning, dredging, or sluicing within the ACEC.
10. Prohibit collection of mineral specimens within the ACEC.
11. Prohibit camping within the ACEC's riparian areas defined as within 100 feet of the water's edge). Permit camping within the 100-year floodplain if consistent with management prescriptions for the rest of the planning area.
12. Limit group activity crossings of perennial streams to dry crossings, established road and trail crossings, or at the designated crossings shown in Figure 2-5.
13. Develop educational brochures and signs promoting public awareness of threatened and endangered fish and wildlife and riparian resources and their needs.
14. Introduce Gila topminnow from Cienega Creek into available habitats (as fully protected) to provide a refugium for the Cienega Creek population.
15. Include the ACEC in a right-of-way avoidance area. Do not allow access routes for maintenance of existing and future utility lines to cross perennial stream reaches except at designated crossings.

7. LAS CIENEGAS ACQUISITION STRATEGY

Purpose and Need

The Sonoita Valley Acquisition Planning District (APD) was designated in the Act establishing Las Cienegas National Conservation Area (NCA) in order to provide for future acquisitions of important conservation land within the Sonoita Valley region of the State of Arizona. The Sonoita Valley APD consists of approximately 142,800 acres of land in the Pima and Santa Cruz Counties, including the 47,000 acre NCA (see Map 1-2).

The Las Cienegas NCA Act directs that “The Secretary shall negotiate with land owners for the acquisition of lands and interest in lands suitable for Conservation Area expansion that meet the purposes described in section 4(a)” (of the Act). The Secretary shall only acquire property under this Act pursuant to section 7 (of the Act)”. The Act requires that acquisitions of lands or interest in lands be from willing sellers only.

The BLM is directed to administer the public lands within the Sonoita Valley APD pursuant to the Act and the applicable provisions of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.), subject to valid existing rights, and in accordance with the management plan. Public lands within the Sonoita Valley APD shall become part of the Conservation Area when they become contiguous with the Conservation Area. Management of the public lands within the Sonoita Valley APD is to be coordinated with that of surrounding county, State, and private lands consistent with the provisions of subsection 3(d) of the Act.

Objectives of the Las Cienegas NCA Acquisition Strategy

Las Cienegas NCA was established to conserve, protect, and enhance for the benefit and enjoyment of present and future generations the unique and nationally important aquatic, wildlife, vegetative, archaeological, paleontological, scientific, cave, cultural, historical, recreational, educational, scenic, rangeland, and riparian resources and values of the public lands while allowing livestock grazing and recreation to continue in appropriate areas.

The objectives of the Las Cienegas NCA acquisition strategy are the following:

1. Consolidate land ownership within the NCA boundary to better conserve, protect, and enhance the values and resources for which the NCA was established, to provide for livestock grazing and recreation in appropriate areas, and to improve overall management efficiency.
2. Acquire lands or interest in lands from willing sellers within the Sonoita Valley APD that meet the purposes of the NCA, for inclusion or potential future inclusion into the NCA.
- c. Coordinate with interested parties on acquisitions through the Sonoita Valley Planning Partnership (SVPP) process to ensure accordance with SVPP developed resource goals and objectives and with the management plan.

Acquisition Criteria

Lands considered for Acquisition within the NCA and Sonoita Valley APD boundaries will be prioritized based on consideration of the following criteria including values, uses and issues:

1. *What are the resource values and uses of the lands?*

Criteria

- Riparian areas (streams and wetlands).
- Watersheds of important riparian areas.
- Rare plant communities.
- High-value wildlife habitat, including important habitat for threatened and endangered species and major linkage areas that provide for wildlife movements.
- Significant cultural and paleontological properties.
- Areas with high visual quality.
- High-value for dispersed recreation opportunities.
- High-value rangelands that support livestock grazing operations.
- Presence of well sites or other water sources.
- Lands that will maintain or provide legal access to public lands.
- Lands previously proposed for some type of protective designation.

2. *What is the risk of development?*

Criteria

- Proximity to large urban area.
- Proximity to major highways.
- Proximity to other developing areas.
- Knowledge that land owner is planning to sell property.

3. *Where is the land located?*

Criteria

- NCA inholding
- Within Sonoita Valley APD and contiguous with NCA boundary (where acquisition will add it to NCA).
- Within Sonoita Valley APD but not contiguous with NCA boundary.
- Within the Section 8 lands (north of Interstate Highway 10).

4. *What is the size of the parcel?*

Criteria

- How large is the parcel?
- In general, acquiring large parcels is more feasible and cost-effective than acquiring small parcels.

Potential Priority Acquisition Blocks Based on Above Criteria

Based on the criteria listed above, the following priority blocks of land were identified as potential acquisition priorities:

- Undeveloped in-holdings within the NCA.
- Undeveloped lands contiguous to the NCA
- Lands connecting the NCA to other protected lands.
- Lands supporting several of the resource values/uses for which the NCA was established.

A subsequent strategy will be prepared between BLM, Arizona State Land Department, and other interested publics to identify specific timeframes and priorities for acquisitions.

Acquisition Methods Available

This strategy addresses both acquisitions of lands and acquisitions of interests in lands through conservation easements. In general, the BLM may acquire lands or conservation easements through purchase, exchange or donation. The Las Cienegas NCA Act further directs that all acquisitions shall be from willing sellers only.

Guidance for acquisitions within the Empire-Cienega planning area, which encompasses all of the Sonoita Valley APD plus additional lands in the valley, comes from two sources. The Las Cienegas NCA Act provides direction for acquisitions within the NCA and Sonoita Valley APD boundaries. Prior to designation of Las Cienegas NCA and Sonoita Valley APD, the source of management direction for acquisitions within the Empire-Cienega planning area was the 1994 land tenure amendment to the Safford Resource Management Plan. The land tenure amendment will continue to provide direction for any acquisitions of lands within the Empire-Cienega planning area that are outside the Sonoita Valley APD .

Acquisition Methods from Las Cienegas NCA Act:

Section 7 of the Las Cienegas NCA Act covers acquisitions of land and interests in land within the Sonoita Valley APD. Section 8 of the Act covers required reports to Congress including a report identifying protective measures for lands north of Interstate Highway 10 (referred to as Section 8 lands). The following is a summary of those sections:

Section 7 - Land Acquisitions

(a) In General -

(1) Priority to Conservation Easements - In acquiring lands or interest in lands under this section, the Secretary shall give priority to such acquisitions in the form of conservation easements.

(2) Private Lands - The Secretary is authorized to acquire privately held lands or interest in lands within the boundaries of the Acquisition Planning District only from a willing seller through donation, exchange, or purchase.

(3) County Lands - The Secretary is authorized to acquire county lands or interest in lands within the boundaries of the Acquisition Planning District only with the consent of the county through donation, exchange, or purchase.

(4) State Lands-

(A) In General - The Secretary is authorized to acquire lands or interest in lands owned by the State of Arizona located within the boundaries of the Acquisition Planning District only with the consent of the State and in accordance with State law, by donation, exchange, or purchase.

(B) Consideration- As consideration for the acquisitions by the United States of lands or interest in lands under this paragraph, the Secretary shall pay fair market value for such lands or shall convey to the State of Arizona all or some interest in Federal lands (including buildings and other improvements on such lands or other Federal property other than real property) or any other asset of equal value within the State of Arizona.

(C) Transfer of Jurisdiction- All Federal agencies are authorized to transfer jurisdiction of Federal lands or interest in lands (including buildings and other improvements on such lands or other Federal property other than real property) or any other asset within the State of Arizona to the Bureau of Land Management for the purpose of acquiring lands or interest in lands as provided for in this paragraph.

(b) Management of Acquired Lands - Lands acquired under this section shall, upon acquisition, become part of the Conservation Area and shall be administered as part of the Conservation Area. These lands shall be managed in accordance with this Act, other applicable laws, and the management plan.

Summary of Section 8. Reports To Congress, Subsection (a).

Section 8(a) of the Las Cienegas NCA Act recognized that not only were the lands within the boundary of the NCA important but that lands outside its boundary possessed unique and valuable qualities as well. The Act requires that within two years the Secretary of the Interior provide Congress with a report that describes the resource values and most effective protection measures for lands north of the Sonoita Valley APD within the Rincon Valley, Colossal Cave area, and Agua Verde Creek corridor north of Interstate 10 to provide an ecological link to Saguaro National Park and the Rincon Mountains and contribute to local government priorities. The report is currently being drafted. The report will identify protective measures for Section 8 lands which potentially may include guidance for and recommendations concerning some form of acquisitions of Section 8 lands by the BLM and/or other entities.

Acquisition Methods From the Safford RMP Land Tenure Amendment:

The Land Tenure Amendment to the Safford District Resource Management Plan (BLM 1994c) made land tenure decisions for the Empire-Cienega planning area. The Empire-Cienega Long Term Management Area was one of 24 long term management areas (LTMA) delineated in the land tenure plan amendment. The boundaries of the Empire-Cienega LTMA correspond to the planning area boundary in the draft and final Las Cienegas RMP/EIS. The decisions in the land tenure plan amendment have been incorporated into both the draft and final Las Cienegas RMP and are common to all alternatives. The Las Cienegas NCA Act now provides guidance for acquisitions within Las Cienegas NCA and the Sonoita Valley APD. However, some of the lands in the planning area are not inside either the NCA or the Sonoita Valley APD boundaries, and so guidance for any acquisitions of those lands

continue to be covered by the Safford RMP land tenure amendment. The Safford RMP land tenure amendment identifies acquisition methods, objectives for land acquisition within the LTMA and identifies desired characteristics for lands to be acquired.

Acquisitions using Land and Water Conservation Fund Act

The Land and Water Conservation Fund (LWCF) Act was established 3 September 1964 by Public Law 88-578, as amended. Effective 1 January 1965, authorized through FY1989 and reauthorized through FY2015 by the Omnibus Budget Reconciliation Act of 1987.

"The purposes of this Act are to assist in preserving, developing and assuring accessibility to all citizens of the United States of America of present and future generations and visitors who are lawfully present within the boundaries of the United States of America such quality and quantity of outdoor recreation resources as may be available and are necessary and desirable for individual active participation in such recreation and to strengthen the health and vitality of the citizens of the United States by: (1) Providing funds for and authorizing Federal assistance to *States* in planning acquisition, and development of needed land and water areas and facilities and (2) Providing funds for the *Federal*; acquisition and development of certain lands and other areas." More than 90% (if not all) of annual allocations over the past 10 years have been appropriated to the Federal "side" of the program. LWCF is a funding authority. LWCF is not an acquisition authority. The Federal Land Policy Management Act (FLPMA) is the authority under which BLM acquires property.

The 1964 legislation provided for acquisition of lands, waters, or interests in lands within exterior boundaries of: National Forest System Including Recreation Areas (administered by USDA), National Park System, National Scenic Trails, National Wild and Scenic Rivers System, National Wilderness Preservation System, and National Wildlife Refuge System. However, no mention was made of BLM or public lands. A 1989 amendment to the LWCF Act expanded to further define "eligible projects" to include BLM and acquisitions of lands, waters and interests in land within or adjacent to existing areas for conservation and recreation purposes such as: National Conservation Areas, National Recreation Areas, National Historic Trails, National Wilderness Areas. The 1989 amendment to the Act also included planning designations such as Area of Critical Environmental Concern (ACEC), Riparian Areas (RA) and Special Recreation Management Areas (SRMA). The Land and Water Conservation Fund was established for two primary purposes, Open Space and Recreation.

Conservation goals are accomplished by purchase, exchange, donation and condemnation (only for access and under special authority).

The LWCF funding **cannot** be used to develop property (improvements), manage property, manage conservation easements, acquire administrative sites, acquire property from State government (or instrumentalities thereof) [ARIZONA exception], acquire property not identified for perpetual retention (i.e. fee, easement), condemn (except for access or special authority).

Acquisitions through Federal Land Transaction Facilitation Act (FLTFA) (aka BACA Bill)

The Federal Land Transaction Facilitation Act (FLTFA) of 2000, P.L. 106-248, was enacted on 9/25/2000. FLTFA does the following:

1. Reaffirms BLM's authorities to sell and exchange public lands under FLPMA but does not amend the substantive provisions of FLPMA relating to disposals and sales.

2. Allows proceeds to be used for acquisitions of inholdings and lands with exceptional resources.
3. Limits Disposals to lands identified for disposal in approved land use plans as of July 25, 2000.
4. Imposes administrative requirements on Secretary to:
 - a. Identify inholdings.
 - b. Prioritize acquisitions of inholdings.
 - c. Complete Sections 205 and 206 appraisals and other legal requirements.

Under FLTFA, BLM can (1) sell public land and use the money for purchases of other lands to benefit BLM or other Federal agencies; (2) use up to 20% of the sale money to cover administrative costs; (3) use up to 80% of the non-administrative dollars within the same state as the property that was sold; (4) use the money to purchase inholdings in Federally designated areas which are any lands within special designated areas managed by BLM and also includes lands within units of the Park Service, Forest Service, USFWS, Wild and Scenic River System, National Trail System, Wilderness or WSA.

Sales are to be conducted under the authority of FLPMA Section 203 and the criteria in the sale regulations (43 CFR 2710). The law does NOT apply to disposal of minerals under section 209 of FLPMA or other types of disposal actions such as R&PP, DLE, etc. The law does not mandate any sales or establish any quotas for sales or purchases.

Other Non-Traditional Methods of Acquisition

These may include General Services Administration (GSA) transfers of property or exchanges of other federal agency assets.

Coordinated Management:

Prior to and during implementation of this acquisition strategy, it is anticipated that there will continue to be management issues arising from the intermixed land ownership patterns within the planning area. These issues may continue in some areas of the Sonoita Valley APD over the long term. Continued coordination between the BLM and appropriate State agencies, counties, private landowners and the U.S. Forest Service will be important in dealing with issues regarding management of public lands and intermixed and surrounding State Trust, county, and private lands and surrounding Forest Service lands. Section 3 of the Las Cienegas Act addresses this coordination need by directing the Secretary to coordinate the management of the public lands within the Acquisition Planning District with that of surrounding county, State, and private lands consistent with the provisions of subsection 3(d).

The Act ensures the protection of State and private lands and interests through subsection 3(d) which states that "Nothing in this Act shall be construed as affecting any property rights or management authority with regard to any lands or interest in lands held by the State of Arizona, any political subdivision of the State of Arizona, or any private property rights within the boundaries of the Acquisition Planning District. Similarly, the Act ensures the continuation of the BLM's management authority over public lands in the Sonoita Valley APD in Section 3 (e) which states "Nothing in this Act shall be construed as in any way diminishing the Secretary's or the Bureau of Land Management's authorities, rights, or responsibilities for managing the public lands within the Acquisition Planning District."

The Act also addresses coordination and cooperative agreements in subsection 6(c) of the Act which states “In order to better implement the management plan, the Secretary may enter into cooperative agreements with appropriate Federal, State, and local agencies pursuant to section 307(b) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1737(b)).”

Other Related Efforts for Open Space Protection

1. Pima County’s Sonoran Desert Conservation Plan.
2. Sonoita Crossroads Community Forum’s Comprehensive Plan for Northeast Santa Cruz County.
3. Legislative efforts: various ballot measures, if passed, would authorize state exchanges, change designation of some state lands to conservation use, etc.
4. Land Trust efforts. The Southeast Arizona Grassland Trust is active in the Sonoita area. This should result in the acquisition of conservation easements on private lands in the Sonoita Valley with important resource values and uses.

Definitions:

Easement: The right to use land in a certain way granted by a landowner to a second party. See also Conservation Easement.

Conservation Easement: An easement to assure the permanent preservation of land in its natural state or whatever degree of naturalness the land has when the easement is granted. Can also be defined as an agreement whereby a landowner sells or donates the right to develop his or her land to the easement holder (a qualified government agency or nonprofit organization).

8. SUMMARY OF BIOLOGICAL OPINIONS

PROJECT NAME: CIENEGA CREEK INTERIM GRAZING PLAN

Date of Opinion: January 8, 1996

Species Affected: Gila topminnow, southwestern willow flycatcher, and lesser long-nosed bat.

Terms & Conditions

1) All actions are to be conducted in a manner that will minimize the take of the Gila topminnow and southwestern willow flycatchers and will minimize the suitability of the area for cowbird habitation.

1.1 - Implement the interim grazing plan as outlined in the BO description, with the exceptions found below.

1.2 - The timing, use, year-long rest, and grazing deferment of the various pastures will be as described. Riparian areas will be excluded from grazing.

1.3 - Livestock units on allotments shall not exceed 1,500 animal units/year.

1.4 - The fencing and construction of the 5 new riparian exclosures and the 6 sacaton pastures will be as specified in the Environmental Assessment.

1.5 - The 3 existing and 4 proposed crossing lanes shown in Table 3 of the BO may be used. The road crossing lane shown on the EA map (T 18 S, R 17 E, Sect. 34) shall be used in rotation with the other 7 proposed and existing lanes. Use of the crossing lanes will be determined through the biological planning process as described in the proposed action. Each lane can be used up to twice/year and all cattle must be moved thorough the lane within 10 days. Cattle must not be allowed to remain in the riparian zone.

1.6 - Existing riparian exclosures and water gaps will not be available to cattle (Karen Trap, A1, A2, A3, A4, Bahti's Bog, Lower 49 Gaps) after adjacent waters are completed. Construction of the represses should begin next to the water gaps. All proposed riparian exclosures and water gaps will be fenced to exclude cattle within one year from the date of this opinion.

1.7 - The fences of all riparian exclosures shall be inspected and maintained at least twice annually.

1.8 - The 14 new well, 6 well equip or redrills, and the associated pipelines must be located as specified in this BO.

1.9 - All new repressos must be located to minimize the likelihood of floods moving exotic fish and bullfrogs into topminnow habitat.

1. Represses should be located outside of the current 100-yr floodplain when possible.
2. Represses shall be located outside of the active channel except for Rattlesnake Tank, and tanks in the Empire Gulch and Cinco Ponds.

3. Represses shall be constructed so runoff from precipitation captured by each represso is minimal.
4. The max. water depth in a represses may not exceed 4ft. at any spot.
5. The represses shall be used only when required to water cattle and shall be allowed to dry when no longer needed to water cattle.
6. If represses do not dry within 6 months after use ends, they shall be drained.
7. Represses should be located so access to the public, and potential for unauthorized release of non-native fish and bullfrogs, is minimized.

1.10. - The locations of the proposed upland plains developments shall be as specified in Tables 6 and 7 of this BO.

1.11. - Implement grazing rotation and pasture use and riparian exclosures and pastures within one year of the date of this opinion.

1.12. - Since no deadline for IGP is given, if the IGP remains in effect more than 5 years after the date of the opinion, the result would be a change in the agency action and reinitiation of section 7 consultation will be required.

2) Monitor the fish community and habitat including crossing lanes, grazed riparian zones, and represses to document the level of incidental take and to check for introduction of exotic fish and bullfrogs.

2.1 - Conduct basin-wide type fish habitat monitoring on at least 4 - 0.25 mile reaches of the creek every 3 years to determine habitat trends.

2.2 - A minimum of 5 habitats will be sampled annually in specified "Fall Fish count" sites prescribed by the AGFD. Blocknets and seines will be used for one pass sampling to determine relative abundance and populations trends and to screen for exotic fishes and bullfrogs.

2.3 - Riparian condition monitoring sites established in 1989 and reread in 1994 will be assessed every 5 years.

2.4 - Visually inspect and photograph the crossing lane and the area downstream from the lane for dead fish and sloughed banks in the period beginning with 1st day of use to the day after use (1-11 days). The inspections should be earlier rather than later.

2.5 - Visually inspect and photograph the grazed portion of Cienega creek near the Narrows annually for negative impacts to riparian condition caused by grazing.

2.6 - Visually inspect each represso 6 months after use to look for evidence of exotic fish and bullfrogs and to determine if draining the represso is necessary. If a sufficient data set has built that shows these inspections to be unnecessary, BLM may cease this action after concurrence with the service.

2.7 - When the Biological Work Group meets, employ them to determine if the IGP is meeting its stated goals and objectives, and if the crossing lanes and the grazed portion of Cienega Creek are undergoing unacceptable degradation.

3) Maintain complete and accurate records of fish and avian populations and habitat monitoring of both the riparian zone and the uplands and all actions taken to implement the terms and conditions of the BO.

3.1 - Maintain complete and accurate records of fish populations and habitat monitoring of both the riparian zone and the uplands. Report on actions taken to implement the terms and conditions of this biological opinion. The report will include the dates that repressos are used, the dates they are inspected after use and if and evidence of exotic fish or bullfrogs are found.

3.2 - Copies of the records required in 3.1 above shall be provided annually to the Service on November 1st.

3.3 - Conduct annual surveys for the willow flycatchers before December 31, 1997, on Cienega Creek and its tributaries that may provide suitable habitat. The survey must follow the southwestern willow flycatcher survey protocol. Personnel conducting the surveys must have attended one of the flycatcher training sessions held annually.

- a. If flycatchers are detected, determine their breeding status using the following criteria:
 - repeated presence of a non-singing southwestern willow flycatcher using vocalizations other than the primary song next to an individual exhibiting territorial behavior;
 - observation of a flycatcher nesting material;
 - observation of flycatchers copulating;
 - verification of a flycatcher nest;
 - observation of a flycatcher carrying food items;
 - observation of a juvenile flycatcher.
- b. If breeding status is confirmed or suspected, continue monitoring efforts by visiting breeding locations at least once during each of the three 10-day periods of June and July or until observation indicates that flycatchers have stopped breeding efforts. Collect breeding and habitat data as outlined in the survey protocol and submit the completed data forms to AGFD Partners in Flight Program.
- c. If flycatcher breeding status is confirmed or suspected, begin a brown-headed cowbird trapping program in the following year by April 1, using established protocols. Once a breeding flycatcher pair is located, assume nesting will occur in the subsequent years and conduct trapping program through the end of July, or until the flycatcher breeding season ends.
 - i. Determine the number and location of traps based on the distribution of flycatcher along the drainage, but include a minimum of 2 traps.
 - ii. Check all traps at least once each day; individual traps should be checked at approximately the same time each day.
 - iii. Maintain data on the brown-headed cowbirds trapping program, including:
 - data trapping is initiated and stopped;
 - locations of traps marked on a topographic map;
 - variations from the established protocol;
 - number and sex of brown-headed cowbirds and non-target species captured;
 - date of each capture.
 - iv. Euthanize all captured brown-headed cowbirds in a humane manner; dispose of the dead birds properly.
 - v. Report to the Service each year on the survey and the trapping program.
- d. Monitor for signs of nest parasitism such a cowbirds fledgling from flycatcher nest(s). If parasitism does occur, reinitiate consultation with the Service to alter management of mitigation measures as needed.

Conservation Recommendations

1. Consultation on road maintenance. Road maintenance and road closure should be addressed in the land use plan.
2. Feasibility of using metal tanks instead of dirt represses for watering livestock. Few represses as possible should be used and used for as short a period as possible.
3. Identify unoccupied sites on the Empire-Cienega that are suitable for Gila topminnow. This effort should be used in consultation and coordination with the Service, AGFD, and Cienega Creek allotment permittee.
4. Conduct a riparian ecological site inventory.
5. Monitor water quality parameters.
6. Measure and monitor vegetation utilization by livestock.
7. Begin research on the effects of cattle grazing on paniculate agaves, and thus, lesser long-nosed bat.
8. Determine how often lesser long-nosed bat use the RCA and the agaves occurring there.
9. Address management strategies that enhance the probability of southwestern flycatchers.

PROJECT NAME: LIVESTOCK GRAZING PROGRAM, SOUTHEASTERN ARIZONA

Date of Opinion: September 26, 1997

Species Affected: (NOTE: only species in bold apply to Empire-Cienega Planning Area Allotments.) Kearney's blue star, Pima pineapple cactus, Nichol's turk's head cactus, Arizona hedgehog cactus, **Huachuca water umbel**, desert pupfish, spikedace, **Gila topminnow**, loach minnow, razorback sucker, (with critical habitat); **southwestern willow flycatcher**, (with critical habitat); cactus ferruginous pygmy-owl, **lesser long-nosed bat**, **jaguar**, and New Mexico ridgenose rattlesnake.

Analysis by Species: (Note: only includes species on Empire-Cienega Planning Area Allotments)

****Huachuca Water Umbel****

Proposed Mitigation Measures

To protect the Huachuca water umbel:

Note: Actions 1-4, 10-11 not applicable to planning area.

5. Existing AMPs for any allotments in Table 7 will be implemented no later than October 1998.
6. AMPs developed pursuant to item d. will be implemented no later than 2 years after completion.
7. Take action by October 1998 that will result in a long-term upward trend in range condition (see footnote on p.43) in areas of "improve" allotments listed in Table 7 that are in fair or poor condition.
8. For allotments in the "custodial" category in Table 7, work with other landowners in the allotment to improve range condition (see footnote on p.43) in areas of fair or poor range condition. Actions the Bureau could take with others may include developing grazing strategies, planning and developing range improvement projects, and providing technical assistance.
9. Work with the Natural resource Service and landowners in the allotments to develop and implement watershed improvement projects that will increase infiltration.
12. Grazing on Bureau-administered lands in the allotments in Table 7 will adhere to the Bureau's Arizona Standards and Guidelines, Upland Livestock Utilization Standard, Safford Drought Policy, Arizona Ephemeral policy, and Riparian Area Policy.

13. Inventory, monitoring, and evaluations as described in the Bureau's proposed action (Bureau 1996a) and applicable sections of the bureau manual, will be conducted in the allotments in Table 7. Inventory, monitoring, and evaluation activities and results; removal of trespass cattle; fence construction; and AMP development will be summarized in an annual report to the Service, due March 15 of the year following the calendar year in which such activities occurred. The first report will be due March 15, 1998.

Conservation Recommendations

(not applicable to planning area)

****Gila Topminnow****

Proposed Mitigation Measures

To protect the Gila topminnow and its habitat:

1. Maintain the enclosure around the Martin Well.
2. Cooperate with the Service and the Arizona Game and Fish to identify site-specific measures to protect populations of topminnow from grazing program impacts as specific impacts are identified. These measures could include, among others, survey of stock waters for nonnative fish, replacement of nonnative fish populations with native fish in perennial stock ponds, and implementation of prescribed fire in grassland vegetation types in the Cienega Creek watershed to improve the condition of the watershed.

Terms and Conditions

Note: Action 1) not applicable to planning area allotments.

2) No action shall be taken that would result in increased grazing pressure at Cold Spring Seep, Nogales or Little Nogales springs, Cienega Creek on the **Empirita allotment**, or Watson Wash.

2.1 - Ensure that any changes in pasturing, season of use, stocking levels, construction or maintenance of range improvements, and other aspects of the grazing program do not result in an increase in cattle use at Cold Springs Seep prior to the fence construction, Nogales and Little Nogales springs, Cienega Creek on the Empirita allotment, or at Watson Wash. Measures to ensure that grazing pressure does not increase may include construction of enclosures to protect topminnow populations.

2.2 - Construct in 1997 a livestock enclosure around Cold Spring Seep (not TFO)

3) Action shall be taken to ensure that watershed effects to topminnow habitat on the **Empirita**, Kimball Community, and Bryce allotments do not increase.

3.1 - Ensure that long-term range condition does not deteriorate and remains in good or excellent condition on the Empirita, Kimball Community, and Bryce allotments.

3.2 - Grazing in the Empirita, Kimball Community, and Bryce allotments shall strictly adhere to the Bureau's Arizona Standards and Guidelines, the Upland Livestock Utilization Standard, Safford Drought Policy, Arizona Ephemeral Grazing Policy, and Riparian Area Policy.

4) Activities that may result in a take of topminnow or destruction of topminnow habitat shall be evaluated, monitored, and modified as needed to reduce potential adverse effects to the species.

4.1 - A mitigation plan shall be developed in coordination with the Service for each range improvement project that may adversely affect topminnow or its habitat, prescribed fire, and vegetation management project in the allotments listed in Table 12 (excluding projects in the Fan allotment and those addressed in previous consultations. Mitigation plans for prescribed fire shall limit to the extent practicable the possibility that fire would spread to riparian habitat at topminnow localities. Plans shall be approved by the Service.

4.2 - Evaluate all stock tanks on the allotments in Table 12 for their degree of risk to introduce nonnative fish to topminnow habitat. The Bureau will then, in conjunction with the Service and Arizona Game and Fish Department, develop and implement management techniques or practices for the tanks in each risk category. Management techniques may include, replacement of the existing tanks with alternative water sources, treatments to eliminate fish, or other appropriate methods. Proposed tanks will undergo the same evaluation for risk, and will include development of a mitigation plan approved by the Service.

4.3 - Inventory, monitoring, and evaluations as described in the Bureau's proposed action and applicable sections of the Bureau Manual shall be conducted in the Empirita, Kimball Community, and Bryce allotments.

5) Monitor incidental take resulting from the proposed action and report to the Service the findings of that monitoring.

5.1 - The Bureau shall submit annual monitoring reports to the Arizona Ecological Services Field Office by March 15 beginning in 1998. These reports shall briefly document for the previous calendar year the effectiveness of the terms and conditions, and documentation of take, if any. If such monitoring occurs, the report shall also summarize the condition of habitat at Gila topminnow localities, and fish monitoring data, including numbers of topminnow observed, presence of nonnative fish, etc. The report shall make recommendations for modifying or refining these terms and conditions to enhance topminnow protection or reduce needless hardship on the Bureau and its permittees.

Conservation Recommendations

1. Regularly monitor the Gila topminnow populations at the localities listed in Table 12 and report the results of such monitoring to this office.
2. Investigate water quality at Cold Spring Seep and take action to correct degraded water quality.
3. Implement prescribed fire on the Cienega Creek watershed to improve watershed condition.
4. Work with the Service and Arizona Game and Fish Department on planning for further introductions of topminnow into suitable habitat.
5. Coordinate with the Service and Arizona Game and Fish on recommendations of extant/extirpated status.

****Southwestern Willow Flycatcher****

Proposed Mitigation Measures

To protect the Southwestern willow flycatcher and its habitat:

Action Plan:

The bureau's Safford and Tucson Offices will develop and implement a plan for the flycatcher that provides for protection and management of flycatcher habitat while implementing Bureau authorized activities.

1) Mapping: Maps will be prepared that convey the following information about the flycatcher habitat managed by the Safford and Tucson Offices:

- a. Location, size, shape, and spacing of habitat areas;
- b. Habitat stage with respect to flycatchers according to the following classification: suitable-occupied, suitable-unoccupied, suitable-unsurveyed, potential in the short term (1-3 yrs), and potential in the long-term (>3 yrs)
- c. Status of flycatcher surveys for each area of suitable habitat: either the date(s) surveyed or indication that the area has not been surveyed.

2) Flycatcher Surveys: A list will be prepared of areas to be surveyed following the most recent Service recommended protocol, along with the anticipated date.

3) Habitat Management Guidelines: Management guidelines (fencing, grazing system use, or habitat improvement activities) will be prepared and implemented for areas at each of the habitat stages defined above for the mapping. These guidelines must include:

- a. Exclusion of livestock grazing within occupies or unsurveyed, suitable habitat during the breeding season (Apr 1-Sept.1)
- b. Management of suitable habitat so that its suitable characteristics are not eliminated or degraded.
- c. Management of potential habitat to allow natural regeneration into suitable habitat as rapidly as possible.

4) Cowbird Control: To reduce the likelihood of nest abandonment and the loss of flycatcher productivity owing to cowbird parasitism associated with the Bureau-administrated grazing activities in or near occupied habitats, the following will be implemented:

- a. Investigate and identify livestock concentration areas on Bureau lands in the action areas that are likely foraging areas for the cowbirds with in a 5-mile radius of occupied or unsurveyed suitable flycatcher habitat (not including the Gila River corridor downstream of the San Jose Diversion in the project area), and evaluate ways to reduce any concentration areas found.
- b. If cowbird concentrations indicate a strong likelihood that parasitism to flycatcher nests is occurring or actual parasitism is documented through nest monitoring, possible cowbird foraging areas will be assessed, and appropriate control measures for cowbirds will be implemented. Evaluation of possible parasitism apply to active flycatcher nests on Bureau-administrated lands which are within 5 miles of Bureau-authorized grazing activities (not including the Gila River corridor downstream of the San Jose Diversion in the project area). These efforts will be coordinate with the Service, APHIS, and Arizona Game and Fish. Monitoring and/or control activities will be conducted by qualified personnel with appropriate permits.

The number and acreage of suitable and potential habitat areas may change due to natural riparian restoration processes, site potential, flood events which alter riparian vegetation and site capability,

refinements in habitat definitions, and additional inventory/mapping efforts. Keep the Service apprized of these sorts of changes on a regular basis.

Direction on this issue (grazing use in occupied or suitable-unsurveyed habitats during the nesting season) will be fully implemented prior to the 1998 flycatcher nesting season. A schedule for completion of the above features will be developed and transmitted to the Service with 60 days of the date of this BO. The Service will respond within 30 days thereafter with comments on the adequacy of the schedule for meeting the intent of the reasonable and prudent alternative.

Terms and Conditions

1) Actions shall be taken to ensure effects of grazing in riparian habitats, with subsequent direct effects to the flycatcher, are minimized.

1.1 - Take immediate action to remove trespass cattle from the San Pedro River RNCA as soon as possible, and measures shall be implemented, including continuing to construct, inspect, and maintain fences, and working diligently with adjacent landowners, to ensure that trespass does not continue.

1.2 - Work with private landowners in the Brunchow Hill allotment to exclude livestock from Bureau-administrated lands in that allotment within the RNCA.

1.3 - AMP's shall be completed within 3 yrs. (or according to a schedule approved by the Service) for any allotments in the improve category listed in table 7 that currently do not have them.

1.4 - Existing AMPs for any allotments in Table 7 shall be implemented no later than October 1998.

1.5 - AMPs developed pursuant to item c. shall be implemented no later than 2 years after completion.

1.6 - Take action by Oct. 1998 that will result in a long-term upward trend in range condition in the "improve" allotments in Table 7.

1.7 - For allotments in the "custodial" category in Table 7, the Bureau will work with the landowners in the allotment to improve range condition in areas of fair or poor range condition. Actions the Bureau could take with others may include developing grazing strategies, planning and developing range improvements projects and vegetation management, and providing technical assistance.

1.8 - Work with Natural Resource Conservation Service and landowners in the allotments to develop and implement watershed improvement projects that will increase infiltration.

1.9 - Do not develop or maintain range improvement projects in the riparian corridor of the San Pedro River, except for fences, cattle guards, and gates to exclude and better manage cattle. Also, do not conduct chemical or mechanical vegetation management or prescribed fire in the riparian zone of the San Pedro or Babocomari rivers for the purpose of managing livestock.

1.10 - Construction, maintenance, or management activities in the riparian zone of suitable or occupied habitat shall occur outside the flycatcher breeding season

1.11 - Construction, maintenance, or management activities in the riparian zone of suitable or occupied habitat shall be planned to avoid removing willows and cottonwoods.

1.12 - Fence maintenance of exclosures, riparian pastures, or boundary fences, and sweeps of occupied or unsurveyed suitable habitat on allotments identified in Table 17 to push out cattle, will be conducted before each flycatcher breeding season.

2) Actions shall be taken to ensure that effects of grazing activities in the watersheds of flycatcher habitat that may result in direct effects to flycatchers, are minimized.

2.1 - A mitigation plan shall be developed in coordination with the Service for each range improvement project and vegetation management project that may adversely affect the flycatcher, and for each prescribed fire in the allotments in Table 17. Mitigation plans for prescribed fire shall limit to the extent practicable the possibility that fire would spread to riparian habitat in the allotments. Mitigation plans shall be approved by the Service.

2.2 - Grazing on the Bureau-administered land allotments in Tables 6 and 16 shall strictly adhere to the Bureau's Arizona Standards and Guidelines, the Upland Livestock Utilization Standard, Safford Drought Policy, Arizona Ephemeral Grazing Policy, and Riparian Area Policy.

3) Where grazing activities may be facilitating brood parasitism, take action to minimize effects to the flycatcher.

3.1 - New livestock management facilities that are likely to attract and support cowbirds must be located beyond 5 miles of occupied, suitable, or potential flycatcher habitat unless such facilities are: (1) located within 5 miles of suitable or occupied habitat on the Gila River downstream of the San Jose Diversion, or (2) crucial to protection of the riparian habitat, and (3) cowbird trapping is implemented to counteract the effect of the facility.

4) Monitor incidental take resulting from the proposed action and report to the Service the findings of that monitoring.

4.1 - Submit annual monitoring reports to the Arizona Ecological Services Field Office by March 15 of each year beginning in 1998. These reports shall briefly summarize for the previous year: (1) effectiveness of these terms and conditions, and (2) documentation of take, if any. If such activities or monitoring occur, the report shall also summarize: (1) inventory, monitoring, and evaluations as described in the Bureau's proposed action (Bureau 1996a) and applicable sections of the Bureau Manual for the allotments in Tables 6 and 16; (2) results of re-assessment of riparian functioning condition conducted every 5 years to assess achievement of habitat improvement; (3) grazing actions initiated or completed, including range improvement projects, prescribed fire, and vegetation management in the allotments in tables 6 and 16; and (4) records of downed or damaged riparian exclosure fences and action taken to remove trespass cattle. The report shall also make recommendations for modifying or refining these terms and conditions to enhance protection of the flycatcher and to reduce needless hardship on the Bureau and its permittees.

****Lesser Long-nosed Bat****

Terms and Conditions

1) Ensure that the grazing program does not facilitate public access to bat roosts.

1.1- Ensure that construction, upgrading, or maintenance of roads associated with the grazing program does not increase or facilitate public access to known day roosts of the bat.

2) Defined project areas and well-defined operational procedures shall be implemented to reduce adverse effects to bat forage plants due to construction of range improvement projects, chemical or mechanical vegetation management, seeding/planting of nonnative plants, or prescribed fire.

2.1 - Prior to construction of range improvement projects, pre-construction surveys shall be conducted for paniculate agaves and saguaros that may be directly affected by construction activities, or in the case of new water sources, may occur within 0.5 mi of the proposed water source. If agaves or saguaros are found during pre-construction surveys, the following measures shall be implemented:

- a. Fences, pipeline, waters, and other range improvement projects shall be located to reduce as much as possible injury and mortality of agaves and saguaros.
- b. Disturbance shall be limited to the smallest area practicable and projects shall be located in previously-disturbed areas whenever possible.
- c. Vehicle use shall be limited to existing routes and areas of disturbance except as necessary to access or define boundaries for new areas of construction or operation.
- d. All workers shall strictly limit their activities and vehicles to designated areas. Construction workers shall be informed of these terms and conditions.

2.2 - No seeding/planting of nonnative plants shall occur on any allotments in which paniculate agaves or saguaros occur.

2.3 - Chemical and mechanical vegetation manipulation and prescribed fire shall be designed and planned to minimize adverse effects to long-nosed bat forage plants. Measures shall be developed to ensure that no more than 20% of agaves that are burned during prescribed fire are killed by the fire and that injury and mortality of saguaros are negligible.

2.4 - A mitigation plan shall be developed by the Bureau in coordination with the Service for the prescribed fire or chemical or mechanical vegetation management project within 0.5 mi of the bat roost or in the areas that support paniculate agaves or saguaros. The mitigation plan shall ensure that effects to bat roosts and forage plants are minimized and shall include monitoring of effects to forage plants. The plan shall be approved by the Service.

3) Support surveys for bats to facilitate better management of bats and their habitat.

3.1- Support surveys for long-nosed bat in the project area. Survey results shall be shared with the Service and used to make management decisions consistent with these terms and conditions.

4) Graze allotments in a manner so as to protect and enhance the forage base of the long-nosed bat.

4.1- Grazing in allotments supporting paniculate agaves or saguaros shall strictly adhere to the Bureau's Arizona Standards and Guidelines, the Upland Livestock Utilization Policy, Safford Drought Policy, and the Arizona Ephemeral Grazing Policy.

5) Monitor incidental take resulting from the proposed action and report to the Service the findings of the monitoring.

5.1- Submit annual monitoring reports to the Arizona Ecological Services Field Office by March 15, 1998. These reports will document the effectiveness of these terms and conditions, and documentation of take (if any). If such activities or monitoring occur, the report shall summarize: (1) grazing actions initiated or completed including range improvement projects, prescribed fires, and vegetation management; (2) monitoring results of prescribed fires; (3) allotment inventory, monitoring, and evaluation results; and (4) long-nosed bats detected. Make recommendations for modifying or refining these terms and conditions to enhance bat protection or reduce needless hardship to the Bureau and its permittees.

Conservation Recommendations

1. In coordination with the Service and the Game and Fish, investigate the effects of the grazing program on the bat and its habitat, including clarifying the distribution of the bat and forage plants on allotments, and quantifying the direct and indirect effects of livestock grazing, development of range improvement projects, and other aspects of the grazing program.
2. Service requests notification of implementation of any conservation actions.

****Jaguar****

Proposed Mitigation Measures

To protect the Jaguar and its habitat:

1. Inform permittees by the letter within 90 days of the date of this opinion that the jaguar is listed as endangered under the Act, take of jaguar is prohibited under the Act, and violators are subject to prosecution and substantial fines.
2. Require that all appropriate State permits are obtained prior to authorizing any control activities.
3. Dense, low vegetation in major riparian corridors within allotments on Bureau-administered lands south of I-10 and Highway 86 will be maintained.

Terms and Conditions

1) Jaguars will not be subjected to any predator control activities, by any entity, associated with the project.

1.1 - Predator control activities associated with livestock grazing and authorized by the Bureau shall require identification of the target animal to species before control activities are carried out. If the identified animal is a jaguar, that individual shall not be subjected to any predator control actions. If, when using dogs to tree mountain lions, a jaguar is inadvertently chased and/or treed by the dogs, the dogs shall be called off immediately once it is realized the animal is a jaguar.

2) Permittees will be informed by the Bureau of the status of the jaguar and the specifics of its protection under the Act.

2.1 - Permittees shall be informed by the Bureau by letter within 30 days of receipt of this BO that take of jaguar, including harm and harassment, is prohibited under the Act and could result in prosecution.

3) All appropriate permits will be obtained prior to any predator control activities associated with the project.

3.1 - Any predator control activities authorized by the Bureau and associated with this project shall be conducted only after all appropriate permits have been obtained.

4) Jaguar habitat will be maintained in identified locations.

4.1 - Dense, low vegetation in major riparian or xero-riparian corridors on Bureau-administrated lands south of Interstate 10 and Highway 86 shall be maintained.

5) Investigate reports of any and all observations of jaguars or their sign in the project area and will provide the Service with a report of such investigations.

5.1- In coordination with the Service and Arizona Game and Fish, we shall investigate all reports that it receives of observations of jaguars in the project area. The investigation shall include appropriate field collection of data. The Bureau is encouraged to enlist the expertise of the AZ Game and Fish. The Bureau shall provide a detailed report of each observation and investigation to the Arizona Ecological Services Office within 30 days of the occurrence of each incident. Such information shall also be included in the annual monitoring report to be submitted by March 15, 1998.

Conservation Recommendations

1. The service recommends that the Bureau fund and/or carry out research to (a) determine the distribution of jaguar habitat within the project area, (b) determine the possible or actual distribution of jaguars within that habitat, and (c) determine means by which that habitat can be maintained and protected.
2. Service requests notification of implementation of any conservation actions.

9. SUMMARY OF EMPIRE-CIENEGA INTERIM GRAZING PLAN

I. INTRODUCTION

The interim livestock grazing management plan has been prepared to guide the management and administration of the ongoing livestock grazing operation on the Empire-Cienega Resource Conservation Area pending the development of the comprehensive land use plan scheduled for 1995. The interim grazing plan identifies the resource objectives, prescribes the manner in which the livestock grazing operation will be conducted to sustain the resources, identifies needed range improvements, provides the monitoring plan to measure the effectiveness of management actions, and details the procedures for the evaluation and modification of the livestock grazing use.

The Empire and Cienega ranches are located just north of the town of Sonoita, between the Whetstone and Santa Rita Mountains, 52 miles southeast of Tucson. The ranches are within Pima and Santa Cruz Counties, Arizona. Elevations average 4,600 feet. The ranches include 36,498 acres of recently acquired public land and 37,462 acres of state owned land.

The Empire and Cienega ranches are within the Santa Cruz River drainage. The broad alluvial Cienega Valley is dissected by Cienega Creek which drains portions of the Santa Rita Mountains to the west, the Canelo Hills to the south, and the Whetstone Mountains to the east. Cienega Creek flows north 20 miles to its confluence with Pantano Wash, which flows through the city of Tucson.

II. OBJECTIVES

A. Upland Vegetation

1. Limit the average utilization to 40 - 60% of current years growth on "key" perennial grass species, and assure the physiological requirements of plant growth, rest, and reproduction are met for "key" species.
2. Monitor Range Condition, Trend, and Utilization at 21 study sites:

B. Riparian Vegetation

1. Maintain or restore an advanced ecological status and proper functioning condition on riparian areas, thus providing the widest variety of vegetation and habitat diversity for wildlife, fish, and watershed protection. This will include constructing fencing and upland water developments necessary to create riparian pastures along the perennial portions of Cienega Creek to provide adequate rest from livestock grazing.

A summary of the perennial stream reaches in the allotment:

Cienega Creek	10.4 Miles
Lower Mattie Canyon	1.25 Miles
Empire Gulch	1.50 Miles

2. Monitor riparian condition and function at 13 sites.

C. Wildlife

1. Improve habitat for antelope, mule deer, white tail deer, and other wildlife species by providing adequate food resources, water cover, and space, with the primary emphasis on antelope habitat. These efforts will include but not be limited to maintaining forage reserves, cooperatively developing wildlife waters, and providing periodic rest to portions of the range.
2. Specific objectives for individual species are pending development of the Land Use Plan Amendment.
3. Provide for the protection and recovery of habitats necessary to support healthy viable populations of the following special status species:

Gila Topminnow, Gila chub, longfin dace
Lowland Leopard Frog
Mexican Garter Snake
Southwestern Willow Flycatcher
Lesser Long-nosed Bat

4. Through analysis of the Upland and Riparian vegetation monitoring programs, and the Fisheries, Wildlife, and Aquatic monitoring programs; evaluate the effects of the livestock grazing on wildlife populations.

D. Watershed

1. Reduce erosion and stabilize the watershed by increasing the overall vegetative ground cover.
2. Measure groundcover at all the proposed upland vegetative monitoring sites.

III. CURRENT AUTHORIZATIONS

The Bureau of Land Management currently leases the federal lands in the Empire-Cienega RCA to John and Mac Donaldson for livestock grazing. The BLM also subleases the State of Arizona livestock grazing leases (05-1597 and 05-1623) to the Donaldsons. The summary of acreage and grazing capacity by ownership is as follows:

Grazing Lease	Acreage	Animal Units
BLM No. 6090	36,538.31.00	704
STATE No. 1597	15,314.40	382
STATE No. 1623	22,147.29	414
TOTAL	74,000	1500

The initial authorized use on the Empire-Cienega Ranch allotment will be 1500 cattle yearlong. Continued data gathering and analysis will be necessary to determine whether this projection is accurate. Utilization figures, along with an analysis of actual use, climate, and range trend data will be used to determine if a change in livestock numbers is needed.

Due to the annual variability in forage production and plant growth resulting from fluctuations in moisture and temperature regimes, it may become necessary to disperse livestock or change from the planned rotation. Under extreme circumstances reduction of livestock numbers or removal of cattle from the allotment may be appropriate.

IV. LIVESTOCK AND HERD MANAGEMENT CONCEPTS

The Donaldson's management philosophy for livestock grazing on the Empire-Cienega is based on one herd of mother cows, moving through a series of flexible pasture rotations as the seasons progress. The ranch is divided into "units of usability," which are variable size units of rangeland that will support the base herd for a certain period of time during a certain time of the year. The units are tied to "primary" water sources.

Under the one-herd concept, all mature female cattle are run together, and all replacement females are bought at breeding age so they can enter into this herd as soon as possible. Bulls are put with the cows in mid-summer and pulled off in the fall. One herd is used to maximize rest in all other nongrazed units, and to better utilize the different species of grasses. Multiple selection of species is possible, and regrazing of species is kept to a minimum. The husbandry of the cattle becomes more efficient due to their concentration.

The rangeland on the planning area can be divided into fairly distinct units of variable size that can support the base herd of cattle for a specified period of time during the grazing rotation.

Units are classified as either:

1. Summer Use - Growing Season Use Units

- A. Sacaton
- B. Upland Plains

2. Winter Use - Dormant - Non-Growing Season Use Units

- A. Empire Mountains
- B. Whetstone Mountains

3. Combination (Growing and/or Non-Growing Season Use)

4. Supplemental Use Units

- A. Horse Pastures
- B. Shipping Pastures
- C. Riparian Pastures

Rangeland Pasture Units

The units of usability are evaluated for their suitability for livestock use during the upcoming pasture rotations (forage quality and availability, water, fencing, etc). A proposed rotation strategy is developed for the animals' physiological needs and the vegetation condition. The proposed rotation is charted on graphs. The proposed livestock actions are then presented to the Biological Planning Team for review.

Once the biological planning has been completed and the upcoming grazing rotations tentatively scheduled, the livestock graze the particular unit of usability selected until monitoring of forage utilization and animal performance show the need to proceed to the next unit in the rotation. Desired levels of utilization may vary depending on the "key" forage species selected, wildlife objectives or concerns, plant penology, time of the year, current condition of the unit, and intensity of past grazing of the unit.

Holding a biological planning meeting in September or October each year to discuss adjustments to livestock numbers based on forage produced in the summer units following the summer monsoon season is critical to livestock management. Decisions on adjusting the herd size need to be made before shipping in October and November when the cattle are in the shipping pasture complex of the ranch.

Riparian Pasture Units

Riparian pasture units are mainly important as watering points for cattle and as lanes to allow cattle to cross from east pasture units to west pasture units. Riparian pasture units would provide only limited grazing for a short time by the main herd. These units could be grazed by a portion of the herd for specified periods to achieve resource objectives such as to reduce fuel loads for fire prevention or to open up marsh areas as open water habitat for waterfowl.

Once the northern riparian pastures are realigned, livestock use of the riparian pastures along Cienega Creek would be restricted to use of the northern 1.5 miles of the creek near the Narrows. The designated crossing lanes would be used as needed to rotate cattle to pastures unless resource objectives are to be achieved and these objectives have been consulted and agreed upon.

Develop range improvements as needed to achieve the resource objectives.

Northern Riparian Pasture Realignment

The highest priority is to complete the riparian pasture development, and realignment of existing fences at the north end of the Mac's sacaton pasture to the Narrows along Cienega Creek. This work would eliminate the need for the Fresno and Dominguez watering points and allow livestock to be excluded from Cienega Creek, except at the very north end at the Narrows, where alternative water sources cannot be easily developed. The fencing would also create additional sacaton pastures adjacent to the riparian pastures of Cienega Creek. This would create opportunities for more intensive pasture management. Cattle could be held longer in sacaton pastures in spring and fall, increasing the amount of rest on the upland summer range.

Table 1
Riparian Crossing Lanes on Cienega Creek

Lane	Pasture	TWP	RNG	Section
New Road Crossing	North/Mac's Sacaton	18 S	17 E	34
New Jesse Lane	North/Lower 49/ Mac's Sacaton	18 S	17 E	26
New Fresno Gap Lane	Lower 49/ Rockhouse/Lower Mattie Sacaton	18S	17	23
New Dominguez Lane	Rockhouse/Fresno	18S	17	13
Narrows Lane	Rockhouse/Apache	18S	18	7
Lower 49 Gaps (Existing)	Lower 49/Mac's Sacaton	18 S	17 E	2

Table 2
Summary of Proposed Fencing

Project Name	Pasture	Township	Range	Section	Units
Spring Water Sacaton Fence	E 500 Acre & 5 Wire & Mac's	19 S 18 S	17 E 17 E	2, 11 34.35	2 mi. 1 mi.
Lower 49 Sacaton Fence	Lower 49/ 500 Acre, 5 Wire	18 S	17 E	26 NW, 27 NE	2 mi.
Lower Mattie Sacaton Fence	L. Mattie/Fresno	18 S	17 E	13, 23, 24, 25, 26	4 mi.
Rockhouse Riparian Fence	Rockhouse/Apache	18 S 18 S	18 E 17 E	6, 7. 12, 13	2 mi.
Narrows Riparian Fence	Empirita	18 S	18 E	6	1 mi.

Table 3
Empire-Cienega Ranch Water Developments

Project Name	Township	Range	Section	Units
Lower 49 Well Drill Equip and Tank and Fence	18 S	17 E	27232627	1 well and tank 1.5 mi fence
Enzenburg North Well and/or Sam's Well Project	18 S	17 E	34 NW	1

Upland Plains Units Developments

The following proposed range improvements would enhance current management by giving more management options and facilitating control and movement of livestock. These improvements are not essential but would be considered when funding becomes available.

Project Name	Township	Range	Section	Units
Mud Springs Well Drill, Equip., and Tank	19 S	18 E	29 NE	1 each
Upper 49 Well Redrill, Equip, and Tank or Reservoir Construction	18 S	17 E	26 NW	1 each
Upper Road Canyon Well Drill, Equip, Tank and Fence	19 S	17 E	16 NE 26,27,35,36	1 well 2 tanks 3 mi fence
Upper Apache Div. Fence	18 S	18 E	222734	3 mi fence
Test Hole Wing Fence	18 S	18 E	2833	1 mi fence
Hilton Pasture Fence	Not Determined			
Road Canyon Div. Fence	Not Determined			

10. INTEGRATED VEGETATION TREATMENT PROGRAM

VEGETATION TREATMENT METHODS

Along with other land management practices, the following vegetation management techniques will be used separately or in combinations to direct desired changes:

A. PRESCRIBED BURNING AND FIRE MANAGEMENT

Fire is a natural process within the grassland-savannah ecological sites. The goal of the Empire-Cienega Planning Area prescribed burning program is to simulate this process in maintaining grassland communities. To meet upland vegetation objectives, fire will be used as a tool to promote vegetation change through decreased shrub cover and increased cover by mid-to-tall-stature perennial grasses.

Prescribed burning is the planned application of fire to rangeland vegetation and fuels under specified conditions of fuels, weather, and other variables to allow the fire to remain in a predetermined area to achieve site-specific objectives. Management objectives include controlling certain plant species; enhancing growth, reproduction, or vigor of plant species; managing fuel loads, and managing vegetation community types. Prescriptions will be developed for each prescribed fire within the planning area. The area is too small to manage unplanned ignitions, so wildland fires will continue to be responded to as described in Chapter 2.

Action: Implement a prescribed fire program for the ecological sites (Sandy Loam Upland, Loamy Upland, and Limy Slopes) within the Empire-Cienega Ranch according to the following:

Prescriptions:

The 20,000 acres proposed for treatment above occur on three primary ecological sites: Sandy Loam Upland, Loamy Upland, and Limy Slopes. Prescriptions will vary by ecological site and condition.

Forecast Narrative:

Site specific burn plans will be developed for each planned unit within a project area. The plan is based on the resource objectives in the environmental analysis for that project. Prescriptions are developed that will achieve resource objectives, allow for firefighter and public safety, and achieve the objectives in the burn permit (smoke management). Temperatures, relative humidity, wind speed and direction, and fuel moisture will be monitored prior to, and during, prescribed fire implementation. A spot weather forecast will be obtained from the National Weather Service prior to ignition. If the forecast is not favorable the burn will be postponed.

Unit Boundaries and Special Considerations:

Many prescribed fire units include "allowable areas" which are used for fire control purposes. Adjacent allowable areas are analyzed for effects, as part of the unit. Prescribed fire units may be delineated within broader treatment areas. Treatment areas are shown on Map X-2-23. Treatment areas may include more than one ecological site. Treatments may include the use of management actions other than, or in combination with, the use of fire.

Unit rotation will be based on minimum fire frequency and drought. If wildland fires occur, the acreage lost to them will be considered in determining the amount of area to be treated with

prescribed fire for the year. Rotation of burn units and carefully planned sequencing will distribute short-term impacts throughout the watershed.

Each fire unit will have an operational site-specific burn plan and a smoke permit in place before being ignited. These plans will include special considerations to protect the following:

- riparian areas
- fish habitat
- cultural resources
- habitat of sensitive wildlife species

Precautions will be taken to ensure the safety of structures and other property. As much as possible, natural features and existing roads will be used to confine the fire. Needed fire control lines will be constructed.

To ensure protection of cultural resources, all prescribed burn areas will be inventoried for archaeological properties, historic structures, and traditional use plants. Areas surrounding such cultural properties will be pretreated to prevent destruction during a prescribed burn. These requirements are specified by BLM Instruction Memorandum AZ-90-52, Requirements for Cultural Resource Inventory of Prescribed Burn Areas.

Units will need to rest from grazing after burning (a minimum of two seasons) to enhance the establishment of new perennial grasses and increase the vigor of perennial grasses present before burning. Rest will also allow litter to accumulate and serve as a mulch and ground cover to protect the soil and enhance the seed bed. Once the desired plant communities have been attained, livestock grazing will resume in the unit.

Sediment control will be applied to burn units following BLM national guidelines and requirements and will also consider Best Management Practices prescribed by Arizona Department of Environmental Quality. Pre-burn and post-burn treatments will be evaluated in the operational burn plan for each unit or block of units. Treatments may include seeding, building physical structures, and mechanical and biological treatments. Any areas to be seeded will be seeded with native species or annual species that are not at risk of establishing on the treatment sites. Units that include Lehmann's lovegrass will be evaluated closely before burning since Lehmann's has been shown to spread as a result of fire.

Unit Size:

Desired annual burned acreage in this area for this fuel type is less than 2,500 acres under fire intensity level 1-2 and less than 300 acres under intensity level 3.

Limit fire size in the broadleaf riparian areas to less than 300 acres per year under intensity level 1-2 and less than 50 acres per year under intensity level 3.

Strive to treat 2,000 acres annually with prescribed fire to create a mosaic pattern in semidesert grasslands and to reduce the increasing and invading brushy species while increasing perennial grasses. Pursue a fuels hazard reduction strategy to reduce the intensity and size of wildfire, should one occur.

Ignition:

Prescribed fires used to improve upland condition will be ignited by hand or aircraft. Helicopters may be used to ignite larger or more complex units.

Agreement:

The use of fire as a tool has some inherent risk. Therefore, it is prudent to have a formal agreement with adjacent land owners that allows for and provides for protection of property. Agreements that address the use of fire on the Empire-Cienega Planning Area and that may affect other lands will be pursued with the State of Arizona, U.S. Forest Service, adjacent private land owners, and the local Natural Resource Conservation District (NRCD), and Sonoita-Elgin Volunteer Fire Department. This agreement should be a proactive, multi-year fire agreement with annual review. BLM will encourage the opportunity for cooperative efforts to restore grassland vegetation components using fire on other lands in the watershed.

Relationship to Other Plans and Guidance:

Treatments would be implemented according to the BLM Prescribed Fire Management Handbook (H-9214-1) and BLM Safford/Tucson Zone Fire Management Plan (1997).

Application of the BLM Safford/Tucson Zone Fire Management Plan (1997):

Because of constant variation in a multitude of factors such as climate; fuels; fire fighting resources available; and risks to life, property and natural resources, this plan is only a guide. The professional judgment of the incident commander, based upon the best information available at the time, will guide the implementing of this plan. Prescribed fire efforts will be curtailed if the target burned acreages are reached through unplanned ignitions.

Constraints common to all the polygons include limiting surface disturbance and fire spread where cultural sites, special status species, or both exist. Fire management staff will meet periodically with program specialists to heighten their awareness of sensitive resources and locations. A practical means to minimize disturbance of sensitive resources will be sought and refined.

Calculation of burned acreages for this plan will include all reported burned acreages by vegetation type or polygon, regardless of ownership. Resource impact is best measured by total acres burned without regard to jurisdictional boundaries. BLM will apply this plan to lands under its jurisdiction and coordinate with and support adjacent jurisdictions. BLM will use the expertise and help of other agencies and entities to achieve multiple use goals through fire.

Recommended actions across all polygons include the following:

- Reducing dangerous fuel buildups near structures.
- Educating the public about wildfire prevention by signing campsites and major roadways or by other forms of outreach
- Continuing to seek increased efficiencies through interagency agreements or other forms of cooperation.

Reaching target burned acreage goals will depend on many factors, including the following:

- Completion and approval of required plans.
- Suitability of weather and resource conditions.
- Availability of financial and personnel resources.

B. CHEMICAL TREATMENTS

Treatments would be conducted according to BLM procedures. The chemicals can be applied by many methods, and the selected technique depends on a number of variables, including the following:

- Treatment objective.
- Physical characteristics of the site, including accessibility and size of the treatment area.
- Characteristics of the target species and the desired vegetation.
- Proximity to sensitive areas.
- Anticipated costs and equipment limitations.
- Water and vegetation condition in the treatment area during the treatment.

Herbicide applications will be scheduled and designed to minimize potential impacts on nonmarket plants and animals. The rates of application will depend on the following:

- Target species.
- Presence of nonmarket vegetation.
- Soil type.
- Depth to water table.
- Presence of other water sources.
 - Label requirements.

The chemicals would be applied aerially or on the ground using vehicles or manual application equipment.

C. MANUAL TREATMENTS

Manual methods of noxious plant control may be practical for the following purposes:

- Clearing scattered plants invading grasslands.
- Cleaning up following other control methods.
- Maintaining treated areas against reinvasion.
- Removing small stands of non-native or poisonous plants before they can spread further.

Simple hand tools such as saws, axes, shovels, and picks are easy to obtain, operate, and repair, but labor costs are high per acre. Workers can also use power tools such as chain saws. In manual treatments workers would cut plants above ground level. Although the manual method of vegetation treatment is labor intensive, it can be extremely species sensitive and can be used around more sensitive habitats and in areas inaccessible to ground vehicles.

D. MECHANICAL TREATMENTS

BLM will also use mechanical methods where practical to control undesirable plants. Choosing the best mechanical method will depend upon several factors:

- Characteristics of the target plant species (density, size of stem, brittleness, and sprouting ability).
- Need for seedbed preparation and revegetation of the treated area.
- Topography and terrain of the treatment area.
- Kind of soil (depth, amount of rock, erosiveness, and degree of compaction).
- Site potential. (The cost of improvement should be consistent with expected productivity.)

Some possible methods include bulldozing, root cutting, plowing, disking, chaining, brush cutting and crushing, mowing, contouring, seedbed preparation, and planting,

E. BIOLOGICAL TREATMENTS

Biological methods of vegetation treatment employ living organisms to selectively suppress, inhibit, or control herbaceous and woody vegetation. Methods include selective grazing by livestock such as goats, sheep, or cattle.

11. EMPIRE-CIENEGA LAS CIENEGAS WEED MANAGEMENT AREA

A noxious weed/invasive species management area is being established on the public lands within the Las Cienegas NCA and Sonoita Valley Acquisition Planning District through this plan. Within the Empire-Cienega Las Cienegas Weed Management Area, management of noxious weeds and invasive species are addressed through the vegetation management priorities as listed in the Record of Decision for Vegetation Treatment on BLM Lands (USDI 1991):

Priority 1: Act to prevent or minimize the need for vegetation control when feasible, considering management objectives for the site.

Priority 2: Use effective nonchemical methods of vegetation control when feasible.

Priority 3: Use herbicides after considering the effectiveness of all potential methods or in combination with other methods or controls. Weed infestations are best prevented by ensuring that the seed or vegetative reproductive plant parts of new weed species are not introduced into a new area. Vegetation management methods will be addressed by site-specific actions.

As guidance, Executive Order 13112 directs federal agencies to do the following in managing invasive species:

1. Identify actions which promote the introduction or spread of invasive species.
2. Subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to:
 - prevent the introduction of invasive species.
 - detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner.
 - monitor invasive species populations accurately and reliably.
 - provide for restoration of native species and habitat conditions in ecosystems that have been invaded.
 - conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species.
 - promote public education on invasive species and the means to address them.
3. not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

References:

“Partners Against Weeds” - An Action Plan for the Bureau of Land Management, January 1996, USDI-BLM
Guidelines for Coordinated Management of Noxious Weeds in the Greater Yellowstone Area

12. FACILITY INVENTORY MAINTENANCE MANAGEMENT SYSTEM (FIMMS)

A. MAINTENANCE LEVELS - ROADS

BLM Road Maintenance Levels - The assigned maintenance level reflects the appropriate maintenance that best fits the Transportation Management Objectives for planned management activities. Roads will be prioritized for maintenance needs or may be maintained at lower levels depending upon funding.

Level 1 - This level is assigned to roads where minimum maintenance is required to protect adjacent lands and resource values. These roads are no longer needed and are closed to traffic. the objective is to remove these roads from the transportation system.

(Minimum standards for Level 1) - Emphasis is given to maintaining drainage and runoff patterns as needed to protect adjacent lands. Grading, brushing, or slide removal is not performed unless roadbed drainage is being adversely affected, causing erosion. Closure and traffic restrictive devices are maintained.

Level 2 - This level is assigned to roads where the management objectives require the road to be opened for limited administrative traffic. Typically, these roads are passable by high clearance vehicles.

(Minimum standards for Level 2) - Drainage structures are to be inspected within a 3-year period and maintained as needed. Grading is conducted as necessary to correct drainage problems. Brushing is conducted as needed to allow administrative access. Slides may be left in place provided they do not adversely affect drainage.

Level 3 - This level is assigned to roads where management objectives require the road to be open seasonally or year-round for commercial, recreation, or high volume administrative access. Typically, these roads are natural or aggregate surfaced, but may include low use bituminous surfaced roads. These roads have defined cross section with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds. User comfort and convenience are not considered a high priority.

(Minimum standards for Level 3) - Drainage structures are to be inspected at least annually and maintained as needed. Grading is conducted to provide a reasonable level of riding comfort at prudent speeds for the road conditions. Brushing is conducted as needed to improve sight distance. Slides adversely affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

Level 4 - This level is assigned to roads where management objectives require the road to be open all year (except may be closed or have limited access due to snow conditions) and to connect major administrative features (recreation sites, local road systems, administrative sites, etc.) to County, State, or Federal roads. Typically, these roads are single or double lane, aggregate, or bituminous surface, with a higher volume of commercial and recreational traffic than administrative traffic.

(Minimum standards for Level 4) - The entire roadway is maintained at least annually, although a preventative maintenance program may be established. Problems are repaired as discovered.

Level 5 - This level is assigned to roads where management objectives require the road to be open all year and are the highest traffic volume roads of the transportation system.

(Minimum standards for Level 5) - The entire roadway is maintained at least annually and a preventative maintenance program is established. Problems are repaired as discovered. These roads may be closed or have limited access due to snow conditions.

B. MAINTENANCE LEVELS - RECREATION SITES

Level 1 - Sites no longer meeting BLM objectives or no longer needed. Begin process to transfer site to another government entity or removing improvements and returning the site to its natural state. Dependent upon specific management transfer to undeveloped natural condition removes site from real property records as soon as possible. Any unused site.

(Minimum standards for Level 1) - No maintenance to be performed. No additional condition survey is required.

Level 2 - Sites included in this level include all undeveloped sites which receive repeated visitor use during all or parts of the year or on a seasonal basis.

(Minimum standards for Level 2) - Maintain to assure health and safety standards are met. Assure protection of the Government investment. Sites maintained on the average, once per year. Condition surveys are completed during time of maintenance.

Level 3 - This level includes sites where some minimum level of recreation facility development of physical resource protection (bank stabilization, gravel surfacing, etc.) Has been established.

(Minimum standards for Level 3) - Maintain to assure health and safety standards are met. Assure protection of the Government investment. Sites maintained to assure fair condition/appearance. Sites maintained on the average, twice a month. All critical repairs made within 10 working days, non-critical repairs made within 20 working days.

Level 4 - This level includes all sites which met less than five of the nine Land and Water Conservation Fund Act requirements for fee collection. Therefore, fees are not charged at these sites.

(Minimum standards for Level 4) - Maintain to assure health and safety standards are met. Assure protection of the Government investment. Sites maintained to assure fair condition/appearance. Sites maintained on the average, once a week during the use season. All systems/services are operational at the start of the use season, and upon failure, repairs are made within two working days. All non-critical repairs made within 10 working days of discovery. Sites maintained to assure fair to good condition/appearance.

Level 5 - Sites that meet five or more of the nine Land and Water Conservation fund Act requirements for fee collections listed below, including both overnight and day use facilities, and fees are collected.

(Minimum standards for Level 5) - Maintain to assure health and safety standards are met. Assure protection of the Government investment. Sites maintained to assure fair condition/appearance. Sites maintained on the average, once a week during the use season. All systems/services are operational at the start of the use season, and upon failure, repairs are made immediately. Repairs to

non-critical items completed within two working days of discovery. Sites maintained to assure fair to good condition/appearance.

Land and Water Conservation Fund Act criteria for fee sites:

1. Tent or trailer sites.
2. Picnic tables.
3. Drinking water.
4. Access roads.
5. Refuse containers.
6. Toilet facilities.
7. Personnel collection of the fee by an employee or agent of the federal agency is operating the facility.
8. Reasonable visitor protection.
9. Simple containers for containing a fire (in areas where fires are permitted).

C. MAINTENANCE LEVEL - TRAILS

The assigned maintenance level reflects the appropriate level of maintenance required to meet management objectives.

Level 1 -These trails are closed to motorized and non-motorized use. This level is the minimum maintenance required to protect adjacent lands and resource values. The objectives may be to remove these trails from the trail system.

(Minimum standards for Level 1) - Emphasis is given to maintaining drainage and runoff patterns as needed to protect adjacent lands. Brushing and removal of hazards is not performed unless trail drainage is being adversely affected, causing erosion. Closure devices are maintained.

Level 2 -Low use trail with little or no contact between parties. Little or no visitor use management. Visitors may encounter obstructions like brush and deadfall.

(Minimum standards for Level 2) - Trail would require condition surveys once every year. Repairs will be done at the beginning of the season to prevent environmental damage and maintain access. Emphasis is given to maintaining drainage and mitigating hazards. The trail may be signed Not regularly Maintained. Major repair may not be done for several seasons.

Level 3 - Moderate use trail with visitor use on a seasonal/and or peak use period with frequent contact between parties. Trail management is conducted with occasional visitor use patrols. Visitors are not likely to encounter obstructions.

(Minimum standard for Level 3) - The trail shall require a minimum of one condition survey 1 to 2 times per season. Major repairs shall be completed annually. Maintenance shall be scheduled two to three times per season, if required, to repair the trail for environmental damage and to maintain access. Trail is kept in good condition.

Level 4 - High use trail used during specific times of the year with high frequencies of contact between parties. Regularly scheduled visitor use patrol and management.

(Minimum standards for Level 4) - Scheduled maintenance shall occur frequently during the use season (three or four times per season). Trail condition and accessibility for persons with disabilities is a major concern. Significant repairs shall be completed as within 10 workdays.

Level 5 - A special high use trail with routine visitor use patrols and management.

(Minimum standards for Level 5) - Has a scheduled maintenance program. Trail condition and accessibility for persons with disabilities is a major concern. Significant repairs shall be completed within 2-3 workdays.

13. BLM

RECREATION MANAGEMENT INVENTORY SYSTEM (RMIS)

ACTIVITY GROUPS AND ACTIVITIES

CAMPING & PICNICKING

- Camping
- Picnicking

NON-MOTORIZED TRAVEL

- Backpacking
- Hiking/Walking/Running
- Bicycling-Road
- Bicycling-Mountain
- Horseback Riding
- Pack Trips

SPECIALIZED NON-MOTOR SPORTS, EVENTS, & ACTIVITIES

- Archery
- Dog Trials
- Hang-Gliding/Parasailing
- Orienteering
- Photography
- Horse Endurance
- Re-enactment Events/Tours

HUNTING

- Hunting-Big Game
- Hunting-Small Game

INTERPRETATION, EDUCATION & NATURE STUDY

- Nature Study
- Environmental Education
- Interpretative Programs
- Therapeutic Programs
- Viewing-Interpretative Exhibits
- Viewing-Cultural Sites
- Viewing-Scenery/Landscapes
- Viewing-Wildflowers
- Viewing-Other

DRIVING FOR PLEASURE

- Driving For Pleasure

OFF-HIGHWAY VEHICLE TRAVEL

- OHV-Cars/Trucks/SUVs
- OHV-ATV
- OHV-Motorcycle

14. MONITORING PROTOCOLS

INTRODUCTION

The following protocols are used in current monitoring for riparian vegetation, aquatic habitats, native fish and upland vegetation. Current monitoring will be expanded and developed into a broad ecological monitoring program (discussed in the second part of this section). The monitoring program will be further developed and summarized in the Final Resource Management Plan

RIPARIAN MONITORING PROTOCOL FOR RIPARIAN AREAS OF CIENEGA CREEK AND TRIBUTARIES

Background

BLM inventoried riparian areas along Cienega Creek and its tributaries on public lands from December 1988 through July 1989 (see Chapter 3, Table 3-9). The riparian inventory techniques are outlined in the Phoenix District's Riparian Area Condition Evaluation (RACE) Handbook (BLM 1987d). As a result of the 1988-89 inventory, 11.1 miles (60%) of riparian habitat received ratings of 5-11 for an overall unsatisfactory rating, and 7.5 miles (40%) of riparian habitat received total ratings of 12-16 for an overall satisfactory rating.

In 1993 and again in 2000, BLM re-assessed the riparian areas along Cienega Creek using the riparian evaluation portion of the RACE inventory. The results showed continued improvement along much of the creek. Of the 11.9 miles of riparian habitat evaluated in 1993, 8.5 miles (71%) were in satisfactory condition, and 3.4 miles (29%) were in unsatisfactory condition. Of the 12.5 miles assessed in 2000, 100% were in satisfactory condition (see Chapter 3, Table 3-9; Appendix 3, Riparian Area Conditions and Management). Riparian proper functioning condition assessments completed in 1993 and in 2000 showed similar trends with the percentage of the creek in proper functioning condition increasing from 2% to 61% (see Chapter 3, Table 3-10, Appendix 3, Riparian Area Conditions and Management).

Protocol

Riparian condition of Cienega Creek, Empire Gulch, Mattie Canyon, and Gardner Canyon will be reassessed every five years using the condition assessment portion of the Riparian Area Condition Evaluation (RACE) inventory as well as the Bureau's Riparian Proper Functioning Condition Assessment.

In addition, 5 key riparian segments will be selected along Cienega Creek for more comprehensive evaluation. These minimum ½ mile segments will also be sampled every five years.

In riparian key areas which are dominated by a cottonwood-willow vegetation community, ten belt transects, 10 feet in width, and spanning the entire floodplain, perpendicular to the stream, will be sampled; the distance between transects will be approximately 250 feet. Within each belt transect, the total number of seedlings, saplings, mature and old trees will be counted by species. The length of each transect (across the flood plain) will also be recorded so that densities of the different age-classes can be calculated for each site. Seedlings are defined as plants less than 1 inch diameter at breast height (dbh) or less than six feet tall; saplings are defined as plants 1-6 inches dbh or greater than six feet tall; mature trees are defined as 6-20 inches dbh; and old trees are defined as greater than 20 inches dbh. For seedlings, utilization (based on browsing of apical stem) will be measured on a subsample of 50 or 100

seedlings (depending on availability) spread over the 10 bands. At each band, the lengths of six different ecological sites (aquatic, regeneration zone, river wash, lower terrace sand bottom, mid terrace sand bottom, upper terrace loamy bottom, upper terrace loamy woodland) will also be measured across the flood plain. These lengths will be used to calculate the percentages of each riparian ecological site at each key segment. Two photo points will be established at each site and two photographs will be taken at each photopoint, one facing upstream and one downstream.

Since the intensive riparian monitoring described above was developed, the vegetation along much of Cienega Creek has made the transition to a cienega dominated system. Monitoring methodologies for riparian key areas dominated by cienega plant communities are still being determined. At a minimum, the percentage of marsh habitat will be monitored using aquatic habitat sampling (see method below), plant composition of upper and lower banks will be monitored in plots along transects, and the percent vegetation cover on stream banks will be monitored according to Platts et al (1983).

AQUATIC HABITAT MONITORING CIENEGA CREEK

Background

In 1989-90 BLM classified all aquatic habitats along the perennial length of Cienega Creek and inventoried them for characteristics related to fish habitat. BLM inventoried habitat type and 12 parameters of habitat complexity, including depth, vegetation cover in the water, cover overhanging the water's surface, and undercut banks. In 2000 BLM re-assessed aquatic habitats along four segments of Cienega Creek to determine change over the 10-year period (see Chapter 3, Tables 3-11, 3-12, and 3-13). The selected segments varied from 0.28 to 0.52 miles in length. They were monitored for the same fish habitat characteristics as in 1989-90.

Protocol

Aquatic habitats will be re-assessed every five years along Cienega Creek at the permanent monitoring stations established along four stream reaches. The stations, tied to easily identifiable land marks, vary from 0.28 to 0.52 miles in length. Within each monitoring segment, habitats will be classified sequentially using the stream habitat classification schemes in McCain et al. (1989) and Hawkins et al. (1993) with the addition of "marsh" as a habitat type. For each habitat unit, the following parameters important to defining fish habitat will be collected: substrate, length, mean channel width and water depth, maximum depth, woody cover, overstory canopy cover, overhanging vegetation, floating vegetation, emergent vegetation, submergent vegetation, undercut bank, bedrock or boulder ledge, Bank stability will be evaluated by measuring the linear quantity of stable and unstable (or disturbed) stream bank and its apparent cause following methods of Platts et al. (1983). In addition basic water quality parameters including temperature, D.O., pH, water clarity (Secchi depth), and conductivity will be measured.

NATIVE FISH MONITORING - CIENEGA CREEK

Background

Since 1988, native fish populations and habitats have been monitored annually along Cienega Creek. The number of sample locations has varied between three and twelve. The location of these stations is tied to pool habitats. Pool selection varied within specific stream reaches from year to year due to the dynamic nature of channel features.

Protocol

A minimum of 5 stations will be sampled each year along Cienega Creek. At each station, 100-200 m of aquatic habitat will be sampled for native fish using fine meshed (1/8 inch) double weighted seines or a backpack electroshocker, depending on the stream conditions. Prior to sampling, the stream transect will be divided into macrohabitats using the same classification system employed for the Aquatic Habitat Monitoring. Afterwards, each macrohabitat will be sampled independently by a single pass of the appropriate sampling equipment. Fish numbers will be enumerated by species and age-class (juveniles vs. adults). These data will be recorded for each macrohabitat along with the distance of individual seine hauls or the number of shocking seconds in that macrohabitat. From these data, the relative abundance by species and age-class will be calculated and an index (catch per unit effort) to absolute abundance will be estimated by normalizing fish numbers by the distance, area or time sampled. Three photopoints will be established at each monitoring station, one on the downstream end of the transect, one on the upstream end, and one in the center. Two photographs will be taken at each photopoint, 1 looking upstream, the other looking downstream, to document gross channel features along the transect and adjacent to it. All monitoring stations will be sampled annually in September through November.

MONITORING STREAMFLOW - CIENEGA CREEK**Background**

BLM measured instantaneous discharge on Cienega Creek monthly from 1988 to 1994 at two stations. One station was located in the reach between Pump and Fresno canyons and the other was located near the confluence of Oak Tree Canyon and Cienega Creek. In 1995 a stream gaging station (water level recorder and galvanized housing) was installed at the site of an old masonry dam on Cienega Creek just above the confluence with Sanford Canyon. Continuous operation of this gage has been limited by maintenance problems and inundation by flood flows. The BLM, in partnership with the U.S. Geological Survey (USGS), will be installing a new continuous recording stream gage at the same location in 2001.

Protocol

Beginning in late 2001, continuous stream flow information should be available from this gage on the USGS real time gage network (http://az.water.usgs.gov/rt-cgi/gen_tbl_pg).

UPLAND VEGETATION MONITORING**Background**

Ecological site inventories have been completed for the Empire-Cienega and Empirita allotments. The results of these inventories and locations of monitoring transects are included in Appendix 3.

Vegetation Sampling Procedures

The following vegetation sampling procedures were followed in the delineated ecological site write-up areas to determine the current conditions:

A 500-foot-long transect (or two parallel transects - 250 feet each) was run in each ecological site where there was a notable difference in appearance. One hundred sample plots (40 cm X 40 cm) were read along the transect at five foot intervals. Vegetation composition, production, species frequency, and ground cover were measured in each plot.

Vegetation Composition

The Dry Weight Rank method of estimating plant species composition was used (Methods of monitoring rangelands and other natural area vegetation) by G. Ruyle (University of Arizona, Division of Range management, Extension Report 9043).

One hundred - 40 cm X 40 cm quadrants were sampled along each 500-foot transect. The three most abundant species on a dry weight basis were identified in the quadrant and ranked. The species yielding the highest annual above ground production was given a rank of 1, the next highest a 2, and the third highest a 3. If a quadrant had less than three species, more than one rank was assigned to some species. The dry weight rank method assumes that a rank of 1 corresponds to 70% composition, rank 2 to 20%, and rank 3 to 10%. These weighing factors were derived empirically (Mannetje and Haydock, 1963). To estimate percent composition for the species within the write-up area, the ranks for each species were summed, multiplied by the weighing factor for each rank, and divided by the sum of the weighted ranks for all species combined.

Vegetation Production

The comparative yield method for estimating range productivity was used (Methods of monitoring rangelands and other natural area vegetation) by G. Ruyle University of Arizona, Division of Range management, Extension Report 9043).

Five reference quadrants or standards (40 cm X 40 cm) were selected adjacent to the transect to represent the range in dry weight of standing plant biomass which was likely to be encountered along the 500-foot transect. The five standards were clipped and weighed to document the production. The transect was then run sampling 100 quadrants along the transect. The vegetation yield in each plot was then compared to the standards and placed in the closest rank.

To estimate the total plant production in lbs/acre, the number of quadrants in each of the comparative yield standards is summed and multiplied by the number of grams clipped for that standard. This total is then multiplied by 0.557 to convert the grams to lbs/acre for that standard. This is done for all five standards. These totals are then added together to calculate the total lbs/acre for the ecological site. To calculate the production of an individual species, the percent composition of the species can be obtained by multiplying the percent composition for that species by the total production for the site.

Plant Species Frequency

The relative abundance of each plant species in each ecological site write-up area was determined using the Pace Frequency sampling method (Methods of monitoring rangelands and other natural area vegetation) by G. Ruyle, University of Arizona, Division of Range Management, Extension Report 9043).

Again 100 quadrants (40 cm X 40 cm) were sampled along a 500-foot transect. The frequency of occurrence for each species was calculated. Herbaceous vegetation species (grasses and forbs) were counted as occurring if they were rooted in the quadrant. Trees and shrubs were counted if they were either rooted in or had canopies that overhung the quadrant. The probability of occurrence for a species (total frequency) was calculated by dividing the number of occurrences by the total number of quadrants (100) sampled.

Ground Cover

Ground cover was measured using along the same 500-foot transect by collecting point intercept data. A pointer was attached on the quadrant frame used for sampling. One hundred points were recorded along the transect. The following categories were used to group cover:

Ground Cover Categories

Bare Ground	0 to 0.24 inches
Gravel	0.25 inches to 3 inches
Rock	>3 inches
Litter (includes annual plants)	

Live Vegetation

Grass/Forb Basal Cover
Canopy Cover
Shrubs/Trees
Basal Cover
Canopy Cover

The ground cover "hit" was determined by visualizing the pointer from a raindrop viewpoint. The first category of cover that the raindrop would intercept on its path to the ground was counted as the "hit". The percent cover was then calculated by dividing the number in each category by the total number of points sampled (100).

PROPOSED UPLAND VEGETATION MONITORING

The monitoring methodologies to be used and the timeframes for collection are as follows:

Upland Vegetation Monitoring Schedule

Study Type	Method	Timeframe
Trend Studies	Pace Frequency	
Ecological Condition	BLM - ESI	
Plant Composition		
Herbaceous Species	Dry Weight Rank	
Woody Species	Clipping Tables	
Plant Production		
Herbaceous Species	Comparative Yield	
Woody Species	Clipping Tables	
Substrate Composition		
Shrub Canopy Cover	Need Protocol	
Ground Cover	Point Intercept	

15. ECOLOGICAL MONITORING PROGRAM

--DRAFT--

INTRODUCTION

In February 2000, the Bureau of Land Management and Sonoran Institute co-sponsored a technical workshop that focused on how to monitor ecological conditions on the Empire-Cienega Resource Conservation Area (RCA) in southeast Arizona. Participants were technical experts from agencies, conservation organizations, academia, and the private sector who have specialized knowledge of the area and its resources.

The goal of the workshop was to frame a threat-based ecological monitoring program for the Empire-Cienega RCA (since designated as the Las Cienegas National Conservation Area) that will ensure both short- and long-term protection of the area's natural resources under a flexible, multi-use management plan.

As a framework for discussions on a threat-based monitoring program, participants reviewed the significant resources and threats which were identified for the proposed Las Cienegas National Conservation Area in the 1999 Cienega Creek Watershed Proposed NCA Assessment.

Significant Resources Identified in the 1999 Cienega Creek Watershed Proposed NCA Assessment:

- Caves and Geology
- History and Archaeology
- Landscape Integrity
- Ranchlands/Ranching
- Recreational Opportunities
- Plant Communities: Upland and Riparian
- Views
- Water Resources
- Wildlife

Significant Threats Identified in the 1999 Cienega Creek Watershed Proposed NCA Assessment:

- Habitat Loss and Fragmentation
- Exotic Animals and Plants
- Groundwater Pumping/Extraction
- Recreation
- Inappropriate Grazing
- Vehicular Traffic, Off-Highway Vehicles
- Urbanization and Development
- Fire Suppression
- Mining
- Channelization

Participants then broke out into 5 groups, each focused on a specific resource category:

1. Water
2. Riparian/Wetland Vegetation
3. Upland Vegetation
4. Aquatic Wildlife
5. Terrestrial Wildlife

Each resource group was tasked with identifying the key ecosystem processes and/or most important resources to monitor for their resource category. For each monitoring component they identified, the five groups then listed the most important monitoring/research questions associated with that component; significant stressors impacting the component; the parameters that should be measured to monitor the condition of the component; and critical linkages among that monitoring component and those addressed by other resource groups. As time permitted, the groups also listed ideas for partnership opportunities and determining thresholds for stressors impacting the system.

RESOURCE GROUP SUMMARIES

The following summaries highlight the key ecosystem processes and resources (i.e., monitoring components) and monitoring parameters that were identified by each of the five resource groups.

This information will be used as the foundation to develop the details of an ecological monitoring program for the NCA.

1. Water Resource Group

Participants: *Bill Branan, Julia Fonseca, Brenda Houser, Lin Lawson, Bill Peachey; facilitated by Shel Clark*

A. Key Ecosystem Processes/Resources:

- Groundwater (Quality and Quantity)
- Surface Water (Quality and Quantity)
- Precipitation

B. Parameters which should be monitored:

Groundwater

Water Quantity:

- Well inventory including current number of wells (baseline) and changes or expansions in network.
- Groundwater levels in riparian monitoring sites – use well points in your cross-sections
- Groundwater levels in areas of potential threats (e.g., the Sonoita area) – use existing wells

Water Quality – in wells (drinking water) and springs:

- Nutrients
- Metals
- SDWA
- Others depending on threats

Surface Water

Water Quantity and Quality:

- Natural variability in length of perennial stream reaches, driest conditions
- Instantaneous base flows of stream during driest conditions
- Data from fixed-continuous stream gauge (stage, temperature, pH, EC)
- Data from crest-stage recorders in tributaries
- Annual inspection of springs for flows, pH, etc.

Precipitation

- Rainfall from multiple gauges in watershed.

2. Riparian/Wetland Vegetation Resource Group

Participants: *Mark Briggs, Dave Gori, Ron Tiller, Frank Toupal, Marty Tuegel, and Peter Warren;*
facilitated by Mary Vint

A. Key Ecosystem Processes/Resources:

Hydrogeomorphological Processes

- Hydrogeomorphology/Proper Functioning Condition (HGM/PFC) stream system assessment¹
- Groundwater Conditions² (depth to saturated soils, recharge)
- Streamflow Characteristics² (flow, volume, patterns)
- Channel Morphology and Sediment Movement (aggradation/erosion; bank stability, channel cutting, gully formation)
- Aquatic Habitats²

¹ See *Applied River Morphology* by Dave Rosgen for information on HGM assessment; the PFC concept is addressed in a number of BLM technical reports.

² Note: The riparian resource group did not fill out a separate worksheet on how to monitor groundwater conditions, streamflow characteristics, or aquatic habitats, since the Water Resource and Aquatic Wildlife Groups addressed these components.

Biotic Resources

- Sensitive Plants (e.g., endangered water umbel)
- Vegetation Mosaic (is it representative, including cottonwood-willow gallery forest, mesquite bosque, sacaton grassland, streambank herbaceous vegetation, and cienega?)
- Sacaton Bottomlands (are they healthy/functioning?)
- Herbaceous Perennials
- Exotic vs. Native Species
- Biodiversity
- Recovery of Agricultural Fields

B. Parameters which should be monitored:

Sacaton Grasslands

- Basal Area and Percent Cover (plots or transects)
- Reproductive Effort (panicle numbers)
- Population Demographics
- Water Stress / Physiology
- Seedling Recruitment (use permanent plots and tagging to track fate of seedlings)
- Percent Cover of Mesquite or Light Interception (PAR or LA1)
- Recovery Patterns (GPS within permanent, reproducible grids established on agricultural fields and/or use low level aerial photography)

Cottonwood -Willow Forest and Stream Channel Vegetation

- Species Composition
- Woody Species Density / Age Classes
- Sapling Density

To monitor species composition, woody species density / age classes, and sapling density, establish stream cross-section transects with sub-plots at intervals.

- Herbaceous Understory Composition Frequency

To monitor herbaceous, streambank vegetation, arrange study plots in a linear array along the channel bank, and record frequency and percent cover using the point intercept method.

Cienega Vegetation

- Cienega Morphology
- Species List
- Density Of Species
- Sediment Input, Stability
- Changes in Cienega Reach Length
- Streamflow
- Depth of Groundwater
-

Huachuca Water Umbel

- Map occurrences of patches (if patchy)
- Conduct frequency plot sampling along reaches where distribution is more continuous.

3. Upland Vegetation Resource Group

Participants: *Wally Alexander, Dave Bertelsen, Steve Boice, Don Breckenfeld, Grant Drennen, Kristen Egen, David Hodges, Linda Kennedy, Gerald Korte, Phil Ogden, Dan Robinett, Stephen Wood;*
facilitated by Alex Conley

A. Key Ecosystem Processes/Resources:

- Precipitation
- Plant Species Frequency, Composition, and Density
- Reference Areas
- Soils
- Cover (Plant, Soil, and Wildlife)
- Utilization / Residual Biomass
- Spread of Exotics / Invaders
- Agave Densities / Nectar Production
- Swales and Drainages
- Fire Records
- Production

B. Parameters which should be monitored:

Plant Species Attributes

- Methods need to be objective (repeatable by different people) so that good estimates of trend can be developed using data from different observers.
- Similarity indexes can be used to assess the progress of a site towards or away from a desired condition. Identifying what is desired is important.
- Frequency and dry-weight rank have been monitored since 1995. Repeat photography is also used at identified key areas. The existing protocol might be improved by adding a measure of density based on the distance to the nearest plant.
- Monitoring data should be used to determine condition and trend for each site.

Soils

- Soil texture, horizons, and depth to restricting layer are good basic measures of soil type and status. Remote imagery can be used to stratify sampling sites.
- Compaction can be monitored by looking at bulk densities and using a densiometer. A penetrometer can provide relative measurements of compaction; a relationship can also be built to convert these measures to bulk density.
- Long-term measurements of soil moisture could be useful.
- Research to correlate changes in soils to changes in vegetative attributes for each soil type would make extensive monitoring much easier.
- Erosion can be monitored by looking at pedestaling and root exposure.

- Visual assessments and repeat photography can be used to monitor headcutting, gullying, and wind erosion.
- Erosion pins can help monitor sheet erosion.
- A ten-point cover frame can be used to measure microtopography
- The WEP model could be useful for erosion prediction, but is data intensive. It uses the distance to nearest plant measurement discussed earlier.
- Measurements of soil crusting could be useful.

Reference Areas

- Reference areas must be big enough to be representative of undisturbed conditions (e.g., big enough to support their own rodent populations), representative of the topography and vegetation types being monitored, and not on an ecotone.
- Reference areas should be set up whenever management is changed, to be used as treatment-specific controls.
- Sampling should be reproducible.
- Documentation of past and current uses should be kept.
- Monitoring should be done at the same time (season) that other sites are monitored.

Cover

- Must first determine what sort of cover and for what managing for-
- Ground cover is being monitored as part of the plant species attribute monitoring (but should be increased from 100 to 400 points per key area).
- Aerial photos can be used to determine tree/shrub cover.
- Canopy cover could easily be added to existing monitoring by estimating Daubenmire cover in each frequency frame.
- For sparrows, grass height and percent of habitat at height x are useful measures. This could be added to existing monitoring efforts by measuring average grass height for each quadrant on the sampling frame.

Utilization

- Formal measurements not currently made but estimates are used in managing livestock.
- Must clearly define type of utilization being measured.
- Timing and method of measurement must be consistent.
- Distribution of utilization is also important; measuring key areas alone may not be enough.
- True utilization is measured after the end of the grazing season
- Stubble height and percent of area that meets criteria are useful measures for determining the amount of cover for sparrows and antelopes.

Exotics and Invasive Species

- Use network of upland vegetation transects.
- Remote sensing to map lovegrass areas and extent.
- Interpretation of historic and recent air photography to measure the extent and rate of mesquite encroachment.

4. Aquatic Wildlife Resource Group

Participants: *Mac Donaldson, Doug Duncan, Jeff Simms, Dale Turner; facilitated by Josh Schachter*

A. Key Ecosystem Processes/Resources:

Ecosystem Processes

- Recharge
- Flooding
- Perennial Surface Flow
- Sediment Balance
- Succession of Riparian Plant Community to a Cienega
- Fluvial Processes that Promote Habitat Diversity
(flooding, sediment deposition, etc.)
- Fire
- Nutrient Cycling

Resources (surrogates for processes)

Top Priority

- Water Quality
- Vegetative and Aquatic Habitat Diversity
- Native/Non-native Species
- Invertebrates (snails and aquatic insects)
- Amphibians, Reptiles, and Fish

Priority Resources Overlapping With Other Resource Groups

- Surface
- Water Quantity
- Types of Surface Water (springs, seeps, creeks, marshes)
- Ducks and Flycatchers
- Micro-organisms (bacteria, algae)

Non-priority

- Small Crustaceans

B. Parameters which should be monitored:

Vegetative and Aquatic Habitat Diversity

- Watershed Condition (see Upland Vegetation Group)
- Water Quantity (see Water Group)
- Bank Disturbance (amount of exposed bank)
- Fire Effects (monitor water quality and sediment)
- Exotic Vegetation (check for presence and distribution)

Amphibians, Reptiles, Fish and Native Species

- Presence, Distribution, and Abundance of Natives and Problem Non-natives

Invertebrates

- Macroinvertebrate Abundance and Diversity

5. Terrestrial Wildlife Resource Group

Participants: *Anita Cramm, Caleb Gordon, Dave Krueper, Janet Ruth, Sherry Ruther, Mike Seidman, Tim Snow, Frances Werner, Jeff Williamson; facilitated by Karen Simms*

A. Key Ecosystem Processes/Resources:

Riparian Specialists

- Birds
- Small Mammals

Grassland Specialists / Endemics (includes sacaton and upland grasslands)

- Birds
- Small Mammals
- Invertebrates
- Biodiversity

B. Parameters which should be monitored:

Riparian Specialists

- song sparrow
- common yellow
- yellow-breasted chat
- red bat

Grassland Specialists/Endemics

Birds

- Site fidelity of sparrows (Cassin's and Botteri's), aplomado falcon
- Density of birds – flushing into nets for sparrows (very intensive); transects for all others
- Biomass/density of grass
 - Grass height 6-8" (average) **may need to modify
 - < 10% shrub composition
 - 75% cover (basal) – grass/grass litter

Note: need to be added to grassland bird sub-objective

 - compositional diversity of grasses
 - native perennial bunchgrasses (not just blue gramma/Lehmann's)

- Productivity and Survivorship –
- Nest search and nest monitoring – Mayfield method may be most
- Breeding birds on territories
- Point counts of singing birds (Cassin's, Botteri's in sacaton)

Small Mammals

- At a minimum, monitor diversity and density of rodents in a typical river bottom environment and an upland grassland habitat. Also monitor diversity and density of rodents in a mostly native grassland area and in an area dominated by Lehmann's lovegrass to determine whether rodents are being affected by the invasion of this exotic. Measurements should be taken once or twice a year using grid trapping.
- Banner-tailed kangaroo rats (*Dipodomys spectabilis*): map and number mounds and determine if active.
- Bats – Endangered lesser long-nosed bat (*Leptonycteris curasoae*): Monitor use of specific agaves by bats at least every other year during the third week of August over several nights. A different agave should be monitored each night.
- Mist netting along Cienega Creek could be used to periodically sample bat diversity in the area.

Invertebrates: **to be completed**

Biodiversity: **to be completed**

CONCLUSION

This information is a **draft** summary of expert opinion regarding which ecosystem processes and resources should be monitored—and how—in order to ensure that the Empire-Cienega RCA's (now Las Cienega's NCA) water, vegetation, and wildlife resources are protected over both the short and long term under a flexible, multi-use management plan. These recommendations will be incorporated into a threat-based ecological monitoring program for the RCA (now NCA) that will be an integral part of the BLM's Final Las Cienegas Resource Management Plan. Cultural resources, views, and human uses including recreation will be focused on in future efforts so the monitoring program can be expanded to address them (see Monitoring Framework). In addition, if lands are added to the NCA in the future with cave resources, then monitoring protocols for cave resources will also be developed.

APPENDIX 3

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1. WELLS AND RESERVOIRS WITHIN THE EMPIRE-CIENEGA PLANNING AREA

Empire and Cienega Ranch Water Wells

Well Name	Location	Current Use	Well Registration No.
E1	T19S,R17E, Sec 19	Capped	55-608607
E2	T19S,R16E,Sec 12	Capped	55-608608
E3 Irey Well	T19S,R17E,Sec 20	Cattle- Sub Elect to a represso	55-608609
E4	T19S,R17E,Sec 8	Capped	55-608610
E5 Guardo Well	T19S,R17E,Sec21	Cattle - Sub Elect to a represso	55-608611
EP1	T19S,R17E,Sec 10	Capped	55-608606
E13 Rattlesnake Well	T19S,R17E,Sec 10	Cattle - Sub Elect to a represso	55-608617
E6 Oak Tree 2 Well	T19S,R16E,Sec 10	Cattle - Sub Elect to a represso	55-608633
E7 Road Well	T19S,R17E,Sec 9	Cattle - Sub Elect to a represso	55-608612
E8 Bill's Well	T19S,R17E,Sec15	Cattle - Sub Elect to a represso	55-608613
E9	T19S,R17E,Sec 10	Capped	55-6-8614
E10	T19S,R17E,Sec 23	Capped (not located)	55-608615
E11 New Cinco Well	T19S,R17S,Sec 14	Cattle - Sub Elect to a represso	55-608632
E12 New Well	T19S,R17E,Sec 1	Cattle - Sub Elect to a represso	55-608616
E14	T20S,R17E,Sec 22	Capped	55-608618
T1 Box Well	T19S,R17W,Sec 3	Cattle - Sub Elect to a represso	55-608619
T3	T20S,R17E,Sec 2	Capped?	55-608620
T4	T19S,R17E,Sec 32	Capped?	55-608621
T6	T20S, R17E,Sec 4	Capped?	55-608622
Sam Irrig Well 1	T18S,R17E,Sec 26	Capped	55-608624
Sam Irrig Well 2 aka Mac's Well	T18S,R17E,Sec 34	Cattle - Sub Elect to a represso	55-608625
Dyke Spring Well	T18S,R17E,Sec 35	Capped	55-608623
Enzenberg Well 1 (Orchard?)	T19S,R17E,Sec 31	Cattle - Elect Sub to a drinker	55-608626

Empire and Cienega Ranch Water Wells, continued

Well Name	Location	Current Use	Well Registration No.
T2 Empire Gulch Artesian Well	T19S,R17E,Sec 17	Cattle - Sub Elect to a represso Fire - Sub Elect to Airport Strip	55-608628
Johnson Well	T20S,R17E,Sec 4	Cattle - Sub Elect to a represso	55-634284
Airport Well	T19S,R17E,Sec 8	Windmill - not used	55-634285
Sprung Well 2	T20S,R17E,Sec 5	Capped	55-634286
Slow Poke Well	T19S,R17E,Sec 6	Developed for cattle and wildlife (old windmill)	55-634287
Upper Spg Water	T19S,R18E,Sec 17	Wildlife and Cattle Sub Elect and windmill	55-634288
Davis Well	T20S,R17E,Sec 22	Cattle - Sub Elect to a represso	55-634291
Mattie Horiz Well	T19S,R18E,Sec 9		55-634289
Sec 5 Horiz Well	T19S,R18E,Sec 5		55-634290
School Sec Well Highway Well	T20S,R17E,Sec 16		55-634292
Reeves Well	T20S,R17E,Sec 15	Cattle - Old Windmill	55-634293
South "Davis" Well	T20S,R17E,Sec 14	Cattle- Old Windmill	55-634294
Upper Hilton Well aka Alvarez Well	T20S,R17E,Sec 10	Wildlife - Windmill to wildlife tank and exclosure	55-634295
Alvarez Well aka Sprung #1	T20S,R17E,Sec 5	Cattle and Antelope via Sub Elect pump and pipeline to Vera Earl Ranch	55-634296
Hummel House Well	T19S,R17E,Sec 28	Domestic-Sub Elect	55-634297
Hummel Pot Hole Well	T19S,R17E,Sec 27	Cattle - Sub Elect to a represso	55-634298
Lower Hilton Well	T19S,R17E,Sec 24	Wildlife-Old Windmill	55-634299
Cottonwood Well	T19S,R17E,Sec 21	Cattle - Sub Elect to a represso	55-634300
Empire HQ Well #1	T19S,R17E,Sec 18	Domestic and Cattle Sub Elect to the Tower Storage Tank	55-634302
Empire Hq Well #2	T19S,R17E,Sec 18	Back-up to the main well, Sub Elect to Tower Storage	55-634301
Cieneguita Well	T19S,R17E,Sec 16	Cattle-Sub Elect to a represso. Also an abandoned windmill	55-634303
Cinco Well	T19S,R17E,Sec13	Wildlife-Solar Elect to a wildlife exclosure	55-634304
Lower Spring Water Well	T19S,R17E,Sec 12	Old Windmill-not in use	55-634305
Ferguson Well	T18S,R18E,Sec 20	Cattle and Wildlife - Sub Elect to a represso	55-634306

Empire and Cienega Ranch Water Wells, continued

Well Name	Location	Current Use	Well Registration No.
Fresno Well	T18S,R18E,Sec 19	Cattle-windmill	55-634307
Mary Kane Well	T19S,R16E,Sec 35	Cattle-Sub Elect to a represso	55-634310
West Well	T19S,R16E,Sec26	Cattle - Windmill	55-634315
Maternity Well	T19S,R16E,Sec 24	Cattle - Sub Elect to a represso	55-634316
Empire Well	T19S,R16E,Sec 14	Cattle-Sub Elect to a represso	55-634317
Oak Tree Well	T19S,R16E,Sec 2	Cattle-Sub Elect to a represso	55-634318
Road Canyon Well	T19S,R17E,Sec 36	Cattle-Windmill to two repressos	55-634319
Diamond A Well	T18S,R17E,Sec 33	None-Old Windmill	55-634320
North Well	T18S,R17E,Sec 32	Cattle-Sub Elect and Windmill to two repressos	55-634321
49 Well	T18S,R17E,Sec 28	Cattle-Windmill	55-634322
Sam Domestic	T18S,R17E,Sec 27	Capped	55-634323
Field Well	T18S,R17E,Sec 26	Not Used-Windmill	55-634324
Sanford Well	T18S,R17E,Sec 15	Horz Well, may look like a sprg	55-634325
Rockhouse Well	T18S,R17E,Sec 10		55-634327
Rockhouse Well 2	T18S,R17E,Sec 10		55-634326
Oil Test Well	T18S,R18E,Sec 33	Cattle-Sub Elect to a represso	55-634328
Mattie Well	T18S,R18E,Sec 31	Cattle/Wildlife Windmill	55-634329
Wood Canyon Well	T18S,R18E,Sec 30	Cattle/Wildlife Sub Elect and Windmill	55-634330
Edwards Well	T18S,R18E,Sec 29	Not Used - Windmill	55-634331
Apache Spg Well	T18S,R18E,Sec 27	Hand dug Well and Spring Development. Gravity flow to Storage Tank and represso for cattle and wildlife. Spring Box used by campers at Apache cabin.	55-634332
Ferguson Well #2	T18S,R18E,Sec 20	Wildlife/Cattle Sub Elect	55-634333
N Enzenberg Well	T18S,R17E,Sec 34	Not used	55-634334
Adobe Barn Well	T18S,R17E,Sec 35	Recreation/Horses. Sub Elect to pressure tank and corral trough	55-634335
Rex Well-Cienega Domestic	T18S,R17E,Sec 35	Cienega House Water	55-634357
Enzenberg 2	T19S,R17E,Sec 31	?	55-636223
Harness Well (55-)	T20S,R17E,Sec 17 SWNENE	Cattle/Wildlife Sub Elect to a represso	

Empire and Cienega Ranch Water Wells, continued

Well Name	Location	Current Use	Well Registration No.
Johnson Well (55-)	T20S,R17E,Sec 4 SWSWNE	Not Used-Old Windmill	
Antelope Well (55-)	T20S,R17E,Sec 2 NWNENE	Cattle-Sub elect to a represso	
Milpa Well (55- 634356)	T18S,R17S,Sec 36	Not Used Windmill	

Empire and Cienega Ranch Reservoirs

Name	Location	Stockpond Claim No.
N Enzenburg #3 Claim	T18S,R17E,Sec 34 SESWNE	#38-25836
N Enzenburg #2	T18S,R17E,Sec 34 SWSENW	38-25837
N Enzenburg # 1	T18S,R17E,Sec 34 SESENW	38-25838
Lower Hilton	T19S,R17E,Sec 24 SWNWSE	38-25846
Oil Well #2	T19S,R17E,Sec 22 SWSENE	38-25847
Oil Well Tank	T19S,R17E,Sec 22 NESESW	38-25848
Wind Tank	T19S,R18E,Sec 19 SESWNE	38-25849
Boulder Tank	T19S,R18E,Sec 19 NWNENE	38-25850
Apache	T18S,R18E,Sec 21 SWNWNW	38-25858
Edwards	T18S,R18E,Sec 29 SENWSE	38-25859
Wood	T18S,R18E,Sec 30 NWSWSE	38-25860
Cienegita	T19S,R17E,Sec 16 NESWNE	38-25865
Empire	T19S,R18E,Sec 9 SWNWSW	38-25882

Empirita Ranch Water Wells

Well Name	Location	Well Registration No.
Chimenea Well	T18S, R17E, Sec. 2, SENE	55-616215
Wild Cat Well	T17S, R17E, Sec. 34, SENE	55-616169
Karen Well	T17S, R17E, Sec. 36 NENW	55-616170
Ken/Bootlegger Well	T17S, R18E, Sec. 31 SWSE	55-616177
Alfalfa Well	T17S, R18E, Sec. 29 NWNW	55-627739
Gary Well	T18S, R18E, Sec. 8 SWNE	55-616223
JoAnn Well	T18S, R18E, Sec. 10 SWNW	55-616224
Big House Circle Well	T17S, R18E, Sec. 17 SENW	55-507443
Mike Well	T17S, R17E, Sec 23, SENW	55-616166

Empirita Ranch Reservoirs

Name	Location	Stockpond Claim No.
The Lake Tank	T17S, R17E Sec 13 SENW	36-04084 36-64888
Dam Tank	T18S, R18E, Sec. 15, NWNW	38-93877

Rose Tree Ranch Water Wells

Well Name	Location	Well Registration No.
Horse Pasture Well	T.20S., R.18E., Section 21 NWNWNW	55-618578
Pasture Well	T.20S., R.18E., Section 17 NESESE	55-618571
Rose Tree LS Well	T.20S., R.18E., Section 17 NESWNW	55-618570
Rose Tree Submersible Well	T.20S., R.18E., Section 20 NENENE	55-618580
High Lonesome Well	T.20S., R.18E., Section 19 NWSWNE	55-618781
Abner Well	T.20S., R.18E., Section 22 SENWSE	55-618574

Rosetree Ranch Reservoirs

Well Name	Location	Stockpond Claim No.
East Reservoir	T.20S., R.18E., Section 8 SESWSW	38-95359/ 36-42179 for "East Drainage
South Tank	T.20S., R.18E., Section 8 SWNWSW	38-95403
Schock Draw & Reservoir	T.20S., R.18E., Section 9 NESESW	38-95358/ Claim No. 36-42180 for "Schock Draw"
The Flats Draw & Reservoir	T.20S., R.18E., Section 17 SWNENE	38-95357/ Claim No. 36-42181 for "The Flats Draw"
Valley Tank & Wash	T.20S., R.18E., Section 17 SESWNW	38-19591/Claim No. 36-42182 for "Valley Wash"
Rose Tree LS No. 1 Pond	T.20S., R.18E., Section 17 NWSWNW	38-95360
Rose Tree LS No. 2 Pond	T.20S., R.18E., Section 17 NWSWNW	38-95402
Rose Tree LS No. 4 Pond	T.20S., R.18E., Section 17 NENWSW	38-95365
Rose Tree LS No. 7 Pond	T.20S., R.18E., Section 19 SENENE	38-95364
Rose Tree LS No. 8 Pond	T.20S., R.18E., Section 19 NESENE	38-95363
Rose Tree LS No. 9 Pond	T.20S., R.18E., Section 20 SWSWNW	38-95362
Rose Tree LS No. 10 Pond	T.20S., R.18E., Section 20 SWSENW	38-95361
Jack Daniels Reservoir & Draw	T.20S., R.18E., Section 22 SWSWNE	Certificate No. 2990/Stockpond Claim No. 38-19595/Claim No. 36-42184 for "Jack Daniels Draw"
Abner Pond & Wash	T.20S., R.18E., Section 22 SENWSE	38-19593/Claim No. 36-42183 for "Abner Wash"
Old Forester Tank & Draw	T.20S., R.18E., Section 23 NWNENW	Certificate No. 2993/Stockpond Claim No. 38-19596/Claim No. 36-42185 for "Old Forester Draw"
Hill and Hill Reservoir & Draw	T.20S., R.18E., Section 23 SWSWNW	Certificate No. 2992/Stockpond Claim No. 38-19598/Claim No. 36-42186 for "Hill & Hill Draw"

2. SPRINGS WITHIN THE EMPIRE-CIENEGA PLANNING AREA

Empire and Cienega Ranch—Springs

Spring Name	Location	Use	Water Filing No.
Apache	T18S,R18E, Sec 27, NWSE	Developed for cattle, wildlife, humans	36-25963
Sec. 5 Horizontal Well	T18S,R18E,Sec 5 NWSESE	Horizontal Well, 2 Cement Tanks	55-634290
Upper Mattie (various) seeps	T19S,R18E, Sec 5 NESWSE	Undeveloped	36-04353
Mud Spring	T19S,R18E, Sec 28, SENWNW	Undeveloped	36-25960
Empire Gulch	T19S,R17E, Sec 18 NENE	Undeveloped and exclosed from cattle	36-25959
Unnamed Spring	T18S,R17E,Sec 35 SESWNW		36-25962
Cold Water Spring	T18S,R17E,Sec 23 SENWSE	undeveloped	36-25965
Sanford Spring	T18S,R17E,Sec 15 NWSWNE		36-25966

Empirita Ranch—Springs

Spring Name	Location	Use	Water Filing No.
Nogales	T18S,R18E, Sec 11 NESE	Undeveloped, but used by livestock and wildlife	36-64894
Little Nogales	T18S,R18E, Sec 11 NESW	Undeveloped, but used by livestock and wildlife	36-64899
Smitty	T17S,R18E, Sec 28 NESW	developed, but abandoned. Used by cattle and wildlife	55-627736
Wakefield	T17S,R18E, Sec 27 NWNW	undeveloped	36-64896
Bootlegger	T17S,R18E, Sec 31 SESW	undeveloped	36-04110
Fresnita Spring	T17S,R18E, Sec. 33 SWNW		36-04112

3. ECOLOGICAL SITE INVENTORIES IN THE EMPIRE-CIENEGA PLANNING AREA

EMPIRE-CIENEGA RANCH ECOLOGICAL SITE INVENTORY

Range and Woodland Site Legend

(This section by Dan Robinett, NRCS, 1995)

Ten upland range sites and five bottomland sites (2 - woodland sites and 3 - range sites) were mapped on the Empire and Cienega ranches within the Empire-Cienega Resource Conservation Area (RCA). Most of this area is within the Major Land Resource Area 41-3 and is desert grassland. Areas in the southern and western part of the Empire - Cienega RCA are transitional to the Major Land Resource Area 41-1 which is plains grassland and oak-grass savannah. In the hilly country on both the west and east sides of Cienega Creek, northern exposures exhibit plant communities characteristic of the 16-20 in. PZ, while the southern exposures exhibit plant communities characteristic of the 12-16 in. PZ. The ecological site inventory was done by Dan Robinett and Grant Drennen in the fall of 1995. Twenty eight sites were inventoried to document the survey. Transects were marked with steel posts and photos were taken. The inventory techniques used included pace-frequency, dry weight-rank , and comparative yield. In addition 100 random points were measured to determine ground cover. Each site was inventoried with a 100 plot transect using a 40 cm square plot frame. Woodland site overstory was inventoried with a 20 tree zig-zag transect. The inventory took about three weeks.

Limy Upland - One large area of this site occurs on the Empire-Cienega ranch. These are shallow, calcareous soils over cemented lime pans. They are light colored in the upper part. Slopes are nearly level to moderate. A long narrow strip of this site extends from the narrows in Cienega Creek all the way up Apache canyon to its confluence with Montosa Canyon. A large wildfire burned this site in 1991 on the north side of Montosa Canyon. Areas of this site on the south side of the canyon which did not burn show the continued thickening of shrubs on this site in the absence of fire for the last century. The potential plant community on this site was a mixture of grasses and shrubs. The dominant grasses include black grama, bush muhly, blue threeawn, stipa, fluffgrass, and slim tridens. The main shrubs are creosotebush, whitethorn, sandpaper bush, sophora and mariola. Small areas of this site occur in complex with other sites in upper Mattie, Spring Water and Mud Springs canyons. Most areas of this site on the ranch are in good ecological condition. The areas that burned in 1991 are in excellent condition.

Limy Slopes - Large areas of this site occur on the northeastern side of the ranch. It occurs in complex with Volcanic Hills in the Empire Mountain area. It occurs in complex with Loamy Uplands along both flanks of Cienega Creek and in complex with Loamy Hills in the south and west parts of the ranch. These are deep, calcareous soils with dark colors in the upper part and with surfaces well protected by covers of gravels and cobbles. Slopes range from moderate to steep. In the large ridges from Apache canyon all the way to Hilton Wash the southern exposures of this site have the potential of the 12-16 PZ and the northern exposures have the potential of the 16-20 PZ. The potential plant community of the south aspects is a mixture of grasses like, black and sideoats gramas, threeawns, wolftail and slim tridens with low shrubs including, false mesquite, zinnia and range ratany. The potential plant community of the north aspects is a grassland dominated by sideoats grama, New Mexico feathergrass, crinkleawn, wooly bunchgrass, threeawns and black grama. Important shrubs include, false mesquite, ratany, dalea, beargrass, agave, sotol and yucca. All areas of this site on the ranch are in either high good or excellent ecological condition.

Limestone Hills - Two small areas of this site occur along the northern boundary of the ranch in the Empire and the Whetstone mountains. It also occurs in complex with other sites in upper Mattie, Spring Water and Mud Springs canyons. These soils are calcareous, gravelly loams, shallow to limestone or calcareous sandstone bedrock. They occur on steep slopes and have well developed covers of gravels and cobbles. Large amounts of rock outcrop occur. The potential plant community on this site was a mixture of shrubs, succulents, perennial grasses and forbs. The main grasses are sideoats and black gramas, slim, rough and shortleaf tridens, southwest stipa, blue threeawn, Hall's panic, bush muhly and spike pappusgrass. Important forbs are croton, twinberry, bahia, globe mallow, penstemon and ground cherry. The main shrubs are ocotillo, Mearns sumac, agave, sotol, prickley pear, dalea, ratany, mint-bush, false mesquite, littleleaf and skunkbush sumacs, desert zinnia, sandpaper bush, sophora and shin dagger. Southern aspects have the potential of the 12-16 in. PZ and northern aspects have the potential of the 16-20 in. PZ. Most areas of this site on the RCA are in good ecological condition and need fire to progress toward excellent condition.

Volcanic Hills - A large area of this site occurs in complex with Limy Slopes in the Empire mountains. Another large area occurs in the Whetstone mountains and scattered areas occur in complex with other sites in Upper Fresno, Mattie, Spring Water and Mud Springs canyons. Soils are shallow and loamy to quartzite and volcanic bedrock. Soil surfaces are well protected by covers of rocks and gravel. They are not calcareous and slopes are moderate to very steep. On the Whetstone mountain side northern aspects have the potential of the 16-20 in. PZ and southern aspects have the potential of the 12-16 in. PZ. The potential plant community of the north aspects is an open canopy of juniper, Emory and Arizona white oak with an understory of perennial grasses, forbs and low shrubs. Dominant grasses are plains lovegrass, sideoats, purple and hairy gramas, green sprangletop, bullgrass, vine mesquite, Texas bluestem, cane beardgrass, prairie junegrass and squirreltail. Important shrubs include mimosa, shrubby buckwheat, agave, yerbe de pasmo, beargrass and skunkbush sumac. The potential community of the south aspects is a diverse mixture of shrubs, succulents, grasses and forbs. The main grasses include sideoats, slender, hairy, sprucetop and black gramas, curly mesquite, plains lovegrass, cane beardgrass, green sprangletop, wolf tail and threeawns. The main shrubs are false mesquite, ratany, mimosa, shrubby buckwheat, ocotillo, agave, prickley pear, shin dagger and banana yucca. Most areas of this site on the ranch are in high good ecological condition. Some areas in the Whetstone Mountains on north aspects are in fair condition due to grass mortality in the last few drought summers and a bumper crop of annual goldeneye in the spring - summer of 1995. These areas had not been grazed during this drought period.

Basalt Hills - One small area of this site occurs south of the narrows flanking Cienega creek. Soils are shallow and clayey. They are also calcareous and formed on bedrock of diabase, shale and related parent materials. Soil surfaces are well protected by covers of cobbles and stones. The potential plant community is a diverse mixture of shrubs, succulents, grasses and forbs. Tobosa and black grama are the dominant perennial grasses. Other grasses include tanglehead, sideoats and slender gramas, threeawns and slim tridens. Common forbs include croton, twinberry, bahia, perezia, hibiscus, trailing four o'clock, spiny goldenhead and grass nuts. The main shrubs are whitethorn, mariola, mintbush, ocotillo, prickley pear, agave, false mesquite, ratany and trixis. This site is in good ecological condition on the ranch.

Clayey Hills - This site occurs in complex with other sites on the northern end of the RCA in Apache, Fresno and Woods canyons on the east side and in Fortynine and Stevenson canyons on the west side. Soils are shallow and clayey. They are non calcareous and are on parent materials like andesite, tuffs and breccias. Slopes are moderate. The potential plant community is dominated by grasses like tobosa, curly mesquite and sideoats grama. Common shrubs include false mesquite, ratany, mimosa, prickley pear and shin dagger. Areas of this site on the ranch are in low good ecological condition.

Loamy Hills - This site occurs as a large unit in the Empire and North pastures and in the West, Hilton and Davis pastures in complex with limy slopes. Soils are deep and loamy textured. They have surfaces that are

well protected by covers of rocks and gravels. Slopes are moderate to steep. North aspects have the potential of the 16-20 inch PZ and southern aspects have the potential of the 12-16 inch PZ. The potential plant community of the northern aspects can have an overstory of Mexican blue, Arizona white and Emory oaks with some one-seed juniper. The understory is dominated by mid-grasses like bullgrass, sideoats and hairy gramas, plains lovegrass, Texas bluestem, beggartick threeawn, green sprangletop and squirreltail. Common shrubs are beargrass, agave, false mesquite, shrubby buckwheat, yerbe de pasmo, herbaceous sage, dalea and mimosa. Important forbs include annual goldeneye, cudweed, stolon daisy, thistle, rosary bean, locoweeds, wild beans and Wrights lotus. The potential plant community on the south aspects is dominated by a mixture of grasses, low shrubs, succulents and forbs. The main grasses include sideoats, slender, hairy and sprucetop gramas, plains lovegrass, falls witchgrass, tanglehead, cane beardgrass and curley mesquite. The dominant shrubs are false mesquite, range and spreading ratanys, mimosas, prickly pear, hedgehog cactus, rainbow cactus and agave. Important forbs include evolvulus, sida, dychoriste, lotus, locoweeds, cudweed, camphorweed, annual goldeneye and aster. Palmers agave reaches its best development on southern aspects of this site. Most areas of this site on the RCA are in high good ecological condition. Some areas on north slopes in the North and Empire pastures are in lesser condition due to grass mortality during the last few summer drought years and the tremendous goldeneye of the spring-summer of 1995.

Loamy Upland - This site occurs in two different physiographic areas on the RCA. It occurs on the first (lower) upland terrace out of Cienega Creek in complex with Sandy Loam Uplands. In this area it has the potential of the 12-16 inch PZ. It also occurs extensively in the southern and western plains on the second (higher) upland terrace area. Here its potential is transitional between the 12-16 inch PZ and the 16-20 inch PZ. These soils are deep , have thin gravelly sandy loam surfaces (2-3 in. thick) over clayey subsoils. Slopes are nearly level to moderate. The potential plant community of the lower terrace area is a grassland dominated by sideoats, blue, hairy and sprucetop gramas, plains lovegrass, cane beardgrass, wolftail and threeawns. Common shrubs include false mesquite, range and spreading ratanys. The main forbs are evolvulus, zinnia, sida, dychoriste, indian wheat and aster. Presently most of this site is dominated by mesquite and burroweed with lesser amounts of sideoats, blue and sprucetop gramas, threeawns, Lehmann lovegrass and curley mesquite. These areas are in high fair ecological condition and will need control of both mesquite and burroweed to reach their potential. The potential plant community of the upper terrace areas is dominated by midgrasses like sideoats grama, cane beardgrass and plains lovegrass with lesser amounts of blue, sprucetop and hairy gramas, wolftail and threeawns. Important shrubs include spreading ratany, false mesquite, agave, groundsel, shrubby buckwheat and yerbe de pasmo. Common forbs are rosary bean, green threads, greeneyes, dychoriste, stolon and rush daisies, evolvulus, sida, cudweed, matweed, snake cotton, zinnia, and thistle. Present day plant communities in this area are approaching their potential and condition is high good. Increases in the native midgrasses are needed to get ecological condition up to excellent. Also included in this area are soils which are similar to Loamy Upland soils but are calcareous in the clayey horizon. These soils produce a plant community similar (in kinds and amounts of plants) to Loamy upland with the addition of several lime loving plant species. It has not yet been described and should be called Limy loam upland and broken out of the Loamy upland site. Loamy uplands also occur in complex with Limy slopes along both sides of Cienega creek and in minor amounts in the large ridges of Limy slopes form Apache canyon south to Hilton wash. In these areas its present day condition is dominated by mesquite with a turf of short gramas and curly mesquite. Ecological condition in these areas is fair.

Sandy Loam Upland - This site occurs primarily on the first (lower) terrace area out of Cienega Creek in complex with Loamy Uplands. The soils are very similar to those for Loamy Uplands except these have much thicker (8-12 in.) surfaces of sandy loam over the clayey subsoils. Slopes are nearly level. The potential here is that of the 12-16 inch PZ and is a grassland dominated by black, sideoats, hairy, slender, Rothrock and sprucetop gramas, plains lovegrass, plains bristlegrass, Arizona cottontop, threeawns and cane beardgrass. Important forbs are evolvulus, sida, cudweed, camphorweed, wild beans, small matweed, daisy, zinnia and

aster. Presently all areas of this site on the RCA have an overstory of mesquite with burroweed in the understory in varying amounts. About half of the area of this site on the ranch been taken over by Lehmann lovegrass. Some areas of this site especially in the North and Enzenberg pastures are in good ecological condition even with the mesquite cover because they have excellent stands of native perennial grasses. Areas dominated by Lehmanns cannot be rated in ecological condition. Lehmann lovegrass reduces the diversity of native plant and animal species but provides adequate soil protection, similar biomass production and may actually be better able to compete with cool season shrubs like mesquite and burroweed than the native grama grasses. Throughout areas of this site, even with Lehmann present, plains lovegrass is increasing and moving into new areas.

Shallow Upland - This site occurs in complex with other sites in Rockhouse and Stevenson canyons on the northwest side of the ranch and in Apache, Fresno and Woods canyons on the northeast side. Soils are shallow or very shallow over hard bedrock of quartzite, rhyolite or sandstone. They are loamy textured and not calcareous. Slopes are nearly level to moderate. The potential plant community is a mixture of perennial grasses and forbs with several species of low shrubs. Important grasses are sideoats, black, hairy, slender and sprucetop gramas, curly mesquite, threeawns, aparejo grass, wolftail and plains lovegrass. The main shrubs are false mesquite, range ratany, dalea, mimosa, ocotillo, agave, prickley pear, zinnia and shrubby buckwheat. Areas of this site on the RCA are presently in good ecological condition.

Loamy Bottom - Swales - This site occurs in complex with Loamy Uplands throughout the west and southern parts of the ranch. It receives extra moisture as a result of runoff from adjacent upland sites. Soils are deep, dark colored silt loams and silty clay loams. Slopes are nearly level. The potential plant community is grassland. Dominant grasses include blue and sideoats gramas, vine mesquite, aparejo grass, cane beardgrass and plains lovegrass. Minor amounts of tobosa and sacaton occur on this site. Important forbs in the plant community are hog potato, spreading globe mallow, coyote melon, buffalo gourd, sunflower, goldenrod and knotweed. Most areas of this site in the north part of the Hilton pasture and in the Johnson and Enzenburg pastures are in low good ecological condition. Some of these swales gullied in the past, are in the process of healing, and most of them have been invaded with mesquite. Most areas of this site in the south part of the Hilton and in the West and Davis pastures are in high good ecological condition with little or no mesquite and very few gullies. Within the area delineated as this site there are inclusions of Clayey bottom range site. These soils are clays with high shrink-swell and exhibit churning and cracking. They are dominated by tobosa and vine mesquite and have similar production as the swales range site. They make up less than ten percent of the unit.

Loamy Bottom - Subirrigated - This site occurs as the primary floodplain of major creeks like Empire, Gardener and Cienega. It receives extra moisture during summer floods and has a seasonally high (4 - 8 feet) water table. Soils are deep, dark colored and heavy textured. Slopes are nearly level. The potential plant community is a sacaton meadow. Minor grasses include blue grama, alkalai sacaton, vine mesquite, sideoats grama and aparejo grass. Common forbs are conzya, sunflower, ragweed, mares tail, pigweed, lambs quarter, coyote melon and buffalo gourd. Most areas of this site on the ranch are in high good to excellent ecological condition. Some areas have been invaded by mesquite but are returning to open sacaton as the bottom becomes wetter and fires burn in these areas, eliminating mesquite. Some areas are drier than others due to channel cutting and deepening that initiated at around the turn of the century. Production on the drier sacaton sites like the Gardener may average about 3000 lbs. per acre. Production on more dependably flooded fields like the Five Wire and the 500 Acre pastures will range from 5000 to 6000 lbs. per acre. Included in the area delineated as this site are small areas which are marshy. They are true wetlands with water at or near the surface year round. These soils are very dark, heavy textured and feature the redoximorphic (gleying and mottling) features, characteristic of poorly drained soils. They are dominated by sedges, rushes, bullrushes,

cattails and forbs like bidens and yerbe mansa. These areas are a “Cienega Site” which has not yet been described and will be in the future as more information can be gleaned about it.

Loamy Bottom - Mesquite - This is a woodland site as it has over 15 percent tree canopy in the potential. This site occurs as a high stream terrace along the steeper reaches of Cienega Creek. It no longer benefits from extra moisture received as flooding but does have a water table at depths of 20 to 40 feet which mesquite roots can reach. Soils are deep, light colored loams and silt loams. Slopes are nearly level. The potential plant community is a mesquite bosque. Canopy of mature velvet mesquite can be as high as 50 percent and trees can reach heights of 40 feet. Other common trees on this site include Mexican elderberry, western soapberry, netleaf hackberry and catclaw acacia. The main shrubs in the understory are wolfberry, greythorn, fourwing saltbush, desert honeysuckle, desert hackberry, crucillo and mimosa. Several vines are important on the site including climbing milkweed, virgins bower, Mexican passion flower and morning-glory. Common understory grasses are sacaton, vine mesquite, green sprangletop, plains bristlegrass, squirreltail and dropseeds. Important forbs on this site are annual mustards, pigweed, lambs quarter, sunflower, ragweed, copperleaf and wheelscale. Most areas of this site on the ranch are at or near their potential. Some areas on the ranch (ie. around Dominguez water) have been cut for firewood and/or bulldozed. Removal of the mesquite overstory on this site can lead to a shrubby regrowth of greythorn, mimosa, wolfberry and mesquite. If salt cedar is present in the watershed it can take over areas of this site where the mesquite canopy has been removed.

Some areas along Cienega Creek resemble this site due to past mesquite invasion of the sacaton meadows. Soils in these areas are the dark colored silty clays and clay loams which developed under dense sacaton. If these areas still have the potential to flood and produce continuous growth of sacaton they will eventually burn often enough, with intense fires that will take out the mesquite.

Sandy Bottom - This site occurs as low stream terraces along drainageways of the major tributaries to Cienega Creek. It benefits from extra moisture received in flooding and as runoff from adjacent uplands. It does not have a water table within the reach of tree roots. Tree canopy on the site is less than 15 percent in the potential making this a range site by definition. Soils are deep and sandy. Slopes are nearly level. The potential plant community on this site is a diverse mixture of trees, shrubs, vines, grasses and forbs. Important trees are mesquite, catclaw acacia, desert willow, netleaf hackberry, Arizona black walnut, western soapberry, Arizona ash, and in some places Arizona white oak and Emory oak. The major shrubs are mimosa, burrobrush, southwest rabbitbrush, desert honeysuckle, fourwing saltbush, skunkbush, desert broom, littleleaf sumac and wolfberry. Vines include virgins bower, canyon grape, climbing milkweed, morninglory and Mexican passion flower. The main grasses are sacaton, spike dropseed, sand dropseed, sideoats grama, green sprangletop, bulb panic, cane beardgrass, Arizona cottontop, plains bristlegrass, deergrass and beggartick threeawn. Important forbs are thistle, coyote melon, wild cotton, sacred datura, sorrel buckwheat, mares tail, lambs quarter, ragweed and pigweed. Most areas of this site on the RCA are in good ecological condition.

Sandy Bottom - Subirrigated - This site occurs as the low stream terrace and streambanks of the wet reaches of Cienega, Empire and lower Mattie canyons. It benefits from extra moisture received as flooding and also from high water tables (4 to 10 feet). Soils are deep and sandy. Slopes are nearly level. The potential plant community is a deciduous riparian woodland dominated by Fremont cottonwood and black willow. Tree canopy can be as high as 70 percent on this site. Other trees found in minor amounts include Arizona ash, Arizona black walnut, Mexican mulberry, desert willow, coyote willow and netleaf hackberry. Common shrubs in the understory are batamote, desert honeysuckle and skunkbush sumac. Canyon grape vine is very common with cissus occuring in minor amounts in rock floored areas. Important grasses are deergrass, sacaton, bulb panic, rice cutgrass, knotroot paspalum, Arizona wildrye, sedges, rushes and bullrush. Important forbs are stickseed bidens, watercress, monkeyflower, water speedwell, cow parsnip, yerbe mansa, pink smartweed, spiny aster, goosegrass, meadow rue, sunflower and ragweed. Most areas of this site on the RCA are

approaching their potential. Throughout areas of this site, even with Lehmann present, plains lovegrass is increasing and moving into new areas.

Shallow Upland - This site occurs in complex with other sites in Rockhouse and Stevenson canyons.

EMPIRE RANCH ESI - Upland Vegetation Transect Locations

Pasture - Unit	Township	Range	Section	Study No.
#1 Shipping Pasture	19S	17E	18 NESE	1
North (Oak Tree N-aspect)	19S	16E	11 NENW	2
North (Oak tree S-aspect)	19S	16E	11 NENW	3
North (North end)	18S	17E	29 SWSE	4
Upper 49 (South end)	18S	17E	29 SENE	5
Rockhouse	18S	17E	10 NESW	6
Rockhouse	18S	17E	10 NESW	7
North (rattlesnake)	19S	17E	9 NWSW	8
Alamo Solo	19S	17E	20 NWSE	9a
Alamo Solo	19S	17E	20 NWSE	9b
Johnson	19S	17E	33 SENW	10
Hilton (Road Cny North aspect)	19S	17E	36 NESE	11
Hilton (Road Cyn South aspect)	19S	17E	36 SENE	12
Hilton (Heart S)	20S	17E	16 NWNW	13
Davis (West)	20S	17E	15 SESW	14
Davis (Middle)	20S	17E	11 NESE	15
Spring Water (L Hilton well)	19S	17E	24 SWSW	16
West (Outside exclosure)	19S	16E	26 NWNE	17
West (Inside exclosure)	19S	16E	26 NWNE	18
5 Wire	19S	17E	11 NWSW	19
Lower Mattie	18S	17E	36 NWNE	20
Upper Mattie	19S	18E	4 SESW	21
Fresno	18S	17E	25 SENE	22
Triangle	18S	18e	7 SWNW	23
Rockhouse (Falls)	18S	17E	14 SESE	24
Fresno (Dominguez)	18S	17E	13 NENW	25
Rockhouse (W of Narrows)	18S	17E	1 SESE	26
Apache (burned)	18S	18E	35 SESW	27
Apache (unburned)	18S	18E	21 SWNE	28

Ecological Site Condition Empire-Cienega Ranch

Ecological Site	Study No.	Acres	Existing Condition (1995 ESI Similarity Index % of Historic Climax Present)	Production Lbs/ac	1995 Esi %Comp.- Perennial Grass	1995 Esi % Bare Ground
Loamy Hills-	11	10050	Excellent (85)	1522	63	9
	12		Good (59)	931	83	22
Limy Slopes	15		Good (61)	931	79	16
Loamy Upland-	13	6577	Excellent (77)	764	93	21
	17		Good (63)	670	60	13
	18		Fair (42)	382	53	24
Swales	10		Good (55)	1866	45	32
	14		Excellent (77)	1888	93	26
Sandy Loam Upland-	8	11523	Fair (44)	1083	66	40
	9A		Fair (31) ¹	1230	69	42
Loamy Upland	9B		Fair (32) ²	949	64	68
	1		Good (54)	1068	74	30
	16		Fair (50)	778	82	25
Loamy Upland- Limy Slopes		6454				
Loamy Hills	2	6058	Excellent (92)	1939	49	9
	3		Good (72)	858	76	20
Limy Slopes	4	10765	Good (60)	908	76	23
	22		Good (54)	775	71	6
Volcanic Hills-	7	3643	Good (72)	1947	72	3
Limy Slopes	6		Excellent (85)	776	70	20
Limestone Hills-	21	4423	Good (66)	3330	35	11
Limy Upland-	28		Good (60)	764	32	-
Volcanic Hills						
Volcanic Hills- Shallow Upland- Clay Hills	5	5036	Good (66)	597	54	19
Volcanic Hills	27	1669	Fair (34)	2609	12	7
Limestone Hills	26	497	Good (67)	975	975	10
Basalt Hills	23	600	Good (71)	1341	58	5
Loamy Bottom (subirrigated)	19	3744	Good (66)	5510	60	24
Loamy Bottom (woodland)	24	581	TreeCanopy 80%	1612	8	8
	25		TreeCanopy-open	1395	12	36
Sandy Bottom (subirrigated)	Riparian	608				

Ecological Site Condition Empire-Cienega Ranch, continued

Ecological Site	Study No.	Acres	Existing Condition (1995 ESI Similarity Index % of Historic Climax Present)	Production Lbs/ac	1995 Esi %Comp.- Perennial Grass	1995 Esi % Bare Ground
Sandy Bottom (swales)	20	1528	Good (65)	3974	63	20
Limestone Hills/Limy Upland/Volcanic Hills		4423				
Limy Slopes/Limy Upland		50				

¹ 31 (Fair) The score does not count Lehman Lovegrass (35% composition) because it is not native

² 32 (Fair) The score does not count Lehman Lovegrass (41% composition) because it is not native

EMPIRITA RANCH ECOLOGICAL SITE INVENTORY

The Ecological Site Inventory was completed in 1994 on the Empirita Ranch. The mapping was done by Kristen Egen of the NRCS.

There are seven range sites on the ranch which all fall in the desert grassland resource area (MLRA 41-3). Soils were mapped in the mid-1980s as part of the soil survey of Eastern Pima County. The following is a brief description of each range site including current and potential condition.

Limy Upland - These are shallow in depth over alluvium. They are limy throughout and may have limy pans or conglomerates. The surface is gravelly. Soils mapped here are Kimrose. Slopes range from 1 to 40% on hillslopes across this unit. Elevations are 3600 to 4800 feet. Most areas of this site are in good condition. The exceptions are the south end of Smitty and the north end of Little JoAnn which are in fair condition. Also, the south 1/4 of Little Joann which is in excellent condition. The present day and potential plant communities on this site are dominated by bush muhly and black grama. Important shrubs include creosote bush, whitethorn acacia and false mesquite. In the areas in fair condition there has been a substantial invasion of sandpaper bush. The areas in excellent condition have had a wildfire in 1989 which knocked back the sandpaper bush.

Limy Slopes - These are shallow to deep soils over alluvium, schist, and fanglomerate. They are calcareous throughout and have lime pans. The surface is very gravelly. Soils mapped here are Powerline, Tombstone, and Deloro. Slopes range from 1 to 40 % on hillslopes with elevations from 3600 to 4800 feet. Most areas of this site are in good condition. The exception is the north half of Little JoAnn which is in fair condition. The present day and potential plant communities are dominated by sideoats grama and black grama. Major shrubs include false mesquite, yucca, ocotilla, and desert zinnia. The fair condition sites, again have sandpaper bush invading. Where fire has occurred, this has begun to resprout.

Volcanic Hills - These are shallow soils on basic igneous rocks, shale, and conglomerate. They are clay loam textured with many cobbles and gravels on the surface. Soils mapped here are Deloro and Pantak. Slopes range from 15 to 70% and elevations are from 4000 to 4600 feet on the ranch. All areas are in good condition except a hill near the Narrows which is in fair condition with excessive erosion. The present day potential plant communities are dominated by sideoats grama. Major shrubs are false mesquite and mesquite. The only species which is in smaller amounts than potential is plains lovegrass which is very palatable and will often decrease with slight grazing. Shrubs have increased in areas also due to the lack of fire.

Limestone Hills - These are shallow soils on sedimentary and metamorphic bedrock which is limy. Rock outcrop sites occur here also. The soil mapped here is Saguaro. Slopes range from 20 to 70% and elevations range from 4800 to 5100 feet. This site is in good condition. The present day and potential plant community is sideoats grama with a mix of many other grasses making up 55 to 70% of the plant community. There are many shrubs all making up less than 5% per species. This site is found in the southeast corner of the Little JoAnn pasture and much of it has burned within the last 10 years.

Loamy Upland - These are deep soils on loamy alluvium on fan terraces and stream terraces. They have a clay horizon near the surface. Soils here are Whitehouse, Caralampi, and Nolah. Slopes range from 1 to 15% and elevations are 3800 to 4000 feet on the ranch. This site ranges from poor condition in the Wildcat pasture where the cattle seem to camp, to fair condition with an upward trend in the Alfalfa, to good condition in the

Anderson Bull where little use occurs. The present day plant communities are mainly burroweed, yucca, and mesquite. The areas in fair to good condition have much more grama grasses. The potential for this site is mainly sideoats grama, plains lovegrass, and cane beardgrass making up 75 to 85% of the composition. This site is showing improvement.

Sandy Bottom - These are very young soils on sandy or gravelly alluvium in the floodplain and on the terraces. It benefits from extra moisture during runoff periods. Soils mapped here are Comoro. Slopes are 0 to 2% and elevations range from 3600 to 4000 feet on the ranch. Areas of this site are in fair condition. The present day plant communities are bermuda grass, rushes, desert willow, and mesquite. Potential for this site is 40 to 55% mixed grasses, with mesquite and willow at only 10 to 15% (the opposite is occurring now). This site encompasses Cienega Creek from the Narrows down to the highway and several smaller washes which feed into it. The combination of heavy loads of water and grazing have caused disturbance to this site.

Deep Sandy Loam - These soils are formed on recent sandy alluvium and have a sandy loam texture. Soils mapped here are Keysto. Slopes range from 1 to 5% and elevation are from 3600 to 4000 feet. This site is along the terraces of Cienega Creek. The site is in fair condition throughout the ranch. The present day plant community is alkali sacaton and mesquite. The potential plant community is mainly cottontop, sideoats grama, and spike dropseed. Major trees and shrubs potentially should only occur as 15 to 20% of the composition. This is a site where animals will spend much time due to the shade and nearby water. With rest rotation this site should begin to show improvement.

Ecological Site Inventories for Rosetree, Vera Earl, and the Empire Mountain Areas

The soils have been mapped for these portions of the planning area. The range sites have not been delineated, nor the sites inventoried using the Ecological Site Inventory Methodology.

Range Site Condition Empirita Ranch (1994)

Ecological Site	Study No.	Acres	Existing Condition	
			(1994 ESI Similarity Index % of Historic Climax Present)	Production Lbs/ac
Basalt Hills		<1		
Deep Sandy Loam /Sandy Bottom		1494	Good	
Loamy Bottom Subirrigated (sacaton) 41-3 (inclusion)	O'Leary (17S,17E,1)			
Sandy Bottom 41-3	O'Leary (17S,18E,7)		Poor	
	Alfalfa (17S,18E,20)		Fair	
Loamy Upland/Limy Slopes Complex 41-3	Wildcat (17S,17E,26)	893	Poor	
Loamy Upland 41-3	KA3* (17S,18E,29) (Smitty #5)	115	Good	
Limestone Hills/Limy Upland/Volcanic Hills		6		
Limestone Hills 41-3	(18S,18E,14) (Little JoAnn)	920	Good	
Sandy Bottom- Subirrigated 41-3	Narrows (18S,18E,6)	5	Fair	
Volcanic Hills 41-3	Anderson (17S,18E,15)	416	Good	
Volcanic Hills/Limy Slopes	Wildcat (17S,17E,34)	3586	Good	
Limy Upland/Limy Slopes Complex 41-3	KA1* (17S,17E,13) (O'Leary #2)	19370	Good	
	(17S,18E,21)		Excellent	
Limy Upland	Smitty (17S,18E,33)		Fair	
Limy Upland	O'Leary (17S,17E,2)		Excellent	
Limy Upland	Narrows (18S,18E,5)		Excellent	
	House (17S,18E,20)		Good	

Range Site Condition Empirita Ranch (1994), continued

Ecological Site	Study No.	Acres	Existing Condition (1994 ESI Similarity Index % of Historic Climax Present)	Production Lbs/ac
Limy Upland	KA2* (17S,17E,25) (Wildcat #3)		Good	
	Crystal (17S,18E,26)		Good	
	Smitty (17S,18E,29)		Good	
Limy Slopes	O'Leary (17S,17E,14)		Good	
Limy Slopes	JoAnn (18S,18E,15)		Fair	
	JoAnn (18S,18E,3)		Fair	
	Wildcat (17S,18E,30)		Good	

4. RIPARIAN AREA CONDITIONS AND MANAGEMENT

Riparian Area Condition Evaluation (RACE) 1989/1993/2000 Summaries for Cienega Creek

Segment			1988/89		1993		2000	
Number	Location	BLM Length	Score	Rating	Score	Rating	Score	Rating
59AA	Bootlegger to Narrows	1.5 mi	-	-	9	U	15	S
59A	Narrows to Apache Canyon	0.3	10	U	13	S	14	S
59B	Apache to Fresno Canyon	0.3	13	S	14	S	14	S
59C	Fresno Canyon to Bedrock Falls	1.6	16	S	15	S	16	S
59D	Bedrock Falls to Pump Canyon	0.4	12	S	13	S	16	S
59E	Pump Canyon to Cienega Falls	0.6	13	S	11	U	14	S
59F	Cienega Falls to Mattie Canyon	0.5	11	U	12	S	15	S
59G	Mattie Canyon to Cold Spring	0.5	13	S	16	S	16	S
59H	Cold Spring to Agricultural Fields	1.0	11	U	13	S	11	U
59I	Agricultural Fields to Canal	1.7	10	U	15	S	12	S
59J	Canal to Oak Tree Canyon	0.9	9	U	12	S	15	S
59K	Oak Tree to Spring Water Canyon	0.3	9	U	12	S	12	S
59L	Spring Water to Gardner Canyon	1.0	10	U	12	S	15	S
59M	Gardner to Head Waters	1.3	13	S	9	U	16	S
59O	near Oil Well Canyon	0.6	11	U	-	-	11	U
Mean Score		12.5 mi	11.5	U	12.8	S	14.1	S

Riparian Proper Functioning Condition Assessment and Associated Management Actions 2000
Summary for Cienega Creek

Segment Number	Segment Location	Rating	Year Management Implemented	Management Action
59AA	Bootlegger to Narrows	PFC	late 2000	Riparian Fencing
59A	Narrows to Apache Canyon	FAR	late 2000	Riparian Fencing
59B	Apache to Fresno Canyon	FAR	late 2000	Riparian Fencing
59C	Fresno Canyon to Bedrock Falls	PFC	late 2000	Riparian Fencing
59D	Bedrock Falls to Pump Canyon	PFC	1990	Riparian Fencing
59E	Pump Canyon to Cienega Falls	FAR	1990	Riparian Fencing
59F	Cienega Falls to Mattie Canyon	PFC	1990	Riparian Fencing
			1999	Develop upland water and close water gap
59G	Mattie Canyon to Cold Spring	PFC	1990	Riparian Fencing
			1999	Stream restoration upstream is returning flood flows
59H	Cold Spring to Agricultural Fields	FAR	1993	Stream restoration project
59I	Agricultural Fields to Canal	FAR	1999	Stream restoration project
59J	Canal to Oak tree Canyon	PFC	1995	Riparian Fencing
59K	Oak Tree to Spring Water Canyon	PFC	1995	Riparian Fencing
59L	Spring Water to Gardner Canyon	PFC	1995	Riparian Fencing
59M	Gardner to Head Waters	PFC	1995	Riparian Fencing

5. CHECKLIST OF BIRDS WITHIN THE EMPIRE-CIENEGA PLANNING AREA

Birds of the Empire-Cienega Planning Area

Common Name (FAMILY)	Species	Occurrence
PODICIPEDIDAE		
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Uncommon
PELICANIDAE		
Brown Pelican	<i>Pelicanus occidentalis</i>	Vagrant
ARDEIDAE		
Great Blue Heron	<i>Ardea herodias</i>	Uncommon
Great Egret	<i>Ardea albus</i>	Uncommon
Snowy Egret	<i>Egretta thula</i>	Uncommon migrant
Cattle Egret	<i>Bubulcus ibis</i>	Uncommon migrant
Green Heron	<i>Butorides virescens</i>	Uncommon migrant ?
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Uncommon migrant
THRESKIORNITHIDAE		
White-faced Ibis	<i>Plegadis chihi</i>	Uncommon migrant
ANATIDAE		
Greater White-fronted Goose	<i>Anser albifrons</i>	Rare migrant
Mandarin Duck	<i>Aix galericulata</i>	Exotic species
Green-winged Teal	<i>Anas crecca</i>	Common migrant and wintering species
Mallard	<i>Anas platyrhynchos</i>	Uncommon migrant and wintering species
Mexican Duck	<i>Anas platyrhynchos diazi</i>	Breeding?
Blue-winged Teal	<i>Anas discors</i>	Uncommon migrant
Cinnamon Teal	<i>Anas cyanoptera</i>	Uncommon migrant
American Wigeon	<i>Anas americana</i>	Uncommon migrant or wintering species
Gadwall	<i>Anas strepera</i>	Uncommon migrant or wintering species
Ring-necked Duck	<i>Aythya collaris</i>	Uncommon migrant or winter visitor to ponds
Bufflehead	<i>Bucephala albeola</i>	Uncommon migrant
Hooded Merganser	<i>Lophodytes cucullatus</i>	Uncommon or rare migrant
CATHARTIDAE		
Turkey Vulture	<i>Cathartes aura</i>	Common summer visitor
ACCIPITRIDAE		
Osprey	<i>Pandion haliaetus</i>	Uncommon migrant
White-tailed Kite	<i>Elanus leucurus</i>	Rare resident species
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Rare migrant or winter species
Northern Harrier	<i>Circus cyaneus</i>	Common wintering species
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Uncommon migrant and wintering species
Cooper's Hawk	<i>Accipiter cooperii</i>	Uncommon resident species
Northern Goshawk	<i>Accipiter gentilis</i>	Accidental
Harris' Hawk	<i>Parabuteo uncinctus</i>	Accidental
Gray Hawk	<i>Buteo nitidus</i>	Uncommon summer
Swainson's Hawk	<i>Buteo swainsoni</i>	Uncommon summer
Zone-tailed Hawk	<i>Buteo albonotatus</i>	Uncommon summer
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Common resident specie
Ferruginous Hawk	<i>Buteo regalis</i>	Rare winter
Golden Eagle	<i>Aquila chrysaetos</i>	Uncommon visitor

Birds of the Empire-Cienega Planning Area, continued

Common Name (FAMILY)	Species	Occurrence
FALCONIDAE		
American Kestrel	<i>Falco sparverius</i>	Common resident species
Merlin	<i>Falco columbarius</i>	Uncommon migrant and wintering species
Peregrine Falcon	<i>Falco peregrinus</i>	Uncommon migrant
Prairie Falcon	<i>Falco mexicanus</i>	Uncommon resident
PHASIANIDAE		
Montezuma Quail	<i>Cyrtonyx montezumae</i>	Uncommon resident
Scaled Quail	<i>Callipepla squamata</i>	Fairly common resident
Gambel's Quail	<i>Callipepla gambelii</i>	Common resident
RALLIDAE		
Virginia Rail	<i>Rallus limicola</i>	Uncommon resident species
Sora	<i>Porzana carolina</i>	Rare in winter
Common Moorhen	<i>Gallinula chloropus</i>	Rare migrant?
American Coot	<i>Fulica americana</i>	Uncommon migrant and wintering species
CHARADRIDAE		
Killdeer	<i>Charadrius vociferus</i>	Fairly common breeding species
SCOLOPACIDAE		
Solitary Sandpiper	<i>Tringa solitaria</i>	Uncommon fall migrant (rare in spring?)
Western Sandpiper	<i>Calidris mauri</i>	Uncommon fall migrant
Common Snipe	<i>Gallinago gallinago</i>	Uncommon winter resident
Wilson's Phalarope	<i>Phalaropus tricolor</i>	Uncommon fall migrant
CUCULIDAE		
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Uncommon nesting species
Greater Roadrunner	<i>Geococcyx californianus</i>	Uncommon resident species
COLUMBIDAE		
Rock Dove	<i>Columba livia</i>	Uncommon resident?
White-winged Dove	<i>Zenaida asiatica</i>	Common summer resident
Mourning Dove	<i>Zenaida macroura</i>	Common resident
Inca Dove	<i>Columbina inca</i>	Uncommon resident
Common Ground-Dove	<i>Columbigallina passerina</i>	Uncommon irregular resident
TYTONIDAE		
Barn Owl	<i>Tyto alba</i>	Uncommon resident
STRIDGIDAE		
Western Screech-Owl	<i>Otus kennicottii</i>	Uncommon resident species
Flammulated Owl	<i>Otus flammeolus</i>	Hypothetical
Great Horned Owl	<i>Bubo virginianus</i>	Common resident
Ferruginous Pygmy Owl	<i>Glaucidium brasilianum</i>	Hypothetical
Elf Owl	<i>Micrathene whitneyi</i>	Uncommon nesting species
Burrowing Owl	<i>Speotyto cunicularia</i>	Uncommon nesting species
CAPRIMULGIDAE		
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Uncommon nesting species
Common Nighthawk	<i>Chordeiles minor</i>	Uncommon summer visitor
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	Uncommon breeding species
APODIDAE		
Vaux's Swift	<i>Chaetura vauxi</i>	Uncommon fall migrant
White-throated Swift	<i>Aeronautes saxatalis</i>	Uncommon year-round visitor

Birds of the Empire-Cienega Planning Area, continued

Common Name (FAMILY)	Species	Occurrence
TROCHILIDAE		
Broad-billed Hummingbird	<i>Cyanthus latirostris</i>	Post-breeding visitor
Plain-capped Starthroat	<i>Helimaster constantii</i>	Rare visitor
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	Fairly common summer
Anna's Hummingbird	<i>Calypte anna</i>	Uncommon migrant and possible breeding species
Costa's Hummingbird	<i>Calypte costae</i>	Uncommon migrant
Calliope Hummingbird	<i>Stellula calliope</i>	Uncommon migrant
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	Uncommon migrant
Rufous Hummingbird	<i>Selasphorus rufus</i>	Uncommon migrant
		Fairly common migrant
TROGONIDAE		
Elegant Trogon	<i>Trogon elegans</i>	Accidental
ALCIDINIDAE		
Belted Kingfisher	<i>Ceryle alcyon</i>	Uncommon migrant and winter resident
Green Kingfisher	<i>Chloroceryl americana</i>	Rare visitor
PICIDAE		
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	Fairly common resident
Gila Woodpecker	<i>Melanerpes uropygialis</i>	Common resident
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	Uncommon migrant and winter resident
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	Common resident
Hairy Woodpecker	<i>Picoides villosus</i>	Accidental
Northern Flicker	<i>Colaptes auratus</i>	Red-shafted form is common resident
TYRANNIDAE		
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>	Uncommon breeding species
Olive-sided Flycatcher	<i>Contopus borealis</i>	Uncommon migrant
Western Wood-Pewee	<i>Contopus sordidulu</i>	Uncommon nesting species
Willow Flycatcher	<i>Empidonax traillii</i>	Uncommon migrant
Hammond's Flycatcher	<i>Empidonax hammondii</i>	Uncommon migrant and winter resident
Dusky Flycatcher	<i>Empidonax oberholseri</i>	Uncommon migrant and winter resident
Gray Flycatcher	<i>Empidonax wrightii</i>	Uncommon migrant and winter resident
Western Flycatcher		
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	Uncommon migrant
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	Uncommon migrant
Black Phoebe	<i>Sayornis nigricans</i>	Common nesting species
Eastern Phoebe	<i>Sayornis phoebe</i>	Rare migrant and winter
Say's Phoebe	<i>Sayornis saya</i>	Common nesting species
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	Common and conspicuous nesting species
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>	Uncommon migrant
Ash-throated Flycatcher	<i>Myiarchus cinerascen</i>	Common nesting species
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	Uncommon nesting species
Tropical Kingbird	<i>Tyrannus melancholicus</i>	Hypothetical
Cassin's Kingbird	<i>Tyrannus vociferans</i>	Common nesting species
Western Kingbird	<i>Tyrannus verticalis</i>	Common nesting species
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Accidental visitor
ALAUDIDAE		
Horned Lark	<i>Eremophila alpestris</i>	Common nesting species

Birds of the Empire-Cienega Planning Area, continued

Common Name (FAMILY)	Species	Occurrence
HIRUDINIDAE		
Purple Martin	<i>Progne subis</i>	Uncommon migrant
Tree Swallow	<i>Tachycineta bicolor</i>	Uncommon migrant
Violet-green Swallow	<i>Tachycineta thalassina</i>	Common migrant and summer visitor
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Common breeding species
Bank Swallow	<i>Riparia riparia</i>	Uncommon migrant
Cliff Swallow	<i>Hirundo pyrrhonota</i>	Common nesting species
Barn Swallow	<i>Hirundo rustica</i>	Common nesting species
CORVIDAE		
Steller's Jay	<i>Cyanocitta stelleri</i>	Rare winter visitor
Scrub Jay	<i>Aphelocoma californica</i>	Rare visitor
Mexican Jay	<i>Aphelocoma ultramarina</i>	Uncommon resident
Chihuahuan Raven	<i>Corvus cryptoleucus</i>	Uncommon resident
Common Raven	<i>Corvus corax</i>	Uncommon resident
PARIDAE		
Bridled Titmouse	<i>Parus wollweberi</i>	Uncommon resident
REMIZIDAE		
Verdin	<i>Auriparus flaviceps</i>	Uncommon resident
AEGITHALIDAE		
Bushtit	<i>Psaltiriparus minimus</i>	Uncommon resident
SITTIDAE		
White-breasted Nuthatch	<i>Sitta carolinensis</i>	Uncommon resident
CERTHIIDAE		
Brown Creeper	<i>Certhia americana</i>	Uncommon resident
TROGLODYTIDAE		
Cactus Wren	<i>Campylorhynchus</i>	Common resident
Rock Wren	<i>Brunneicapillum</i>	Uncommon resident
Canyon Wren	<i>Salpinctes obsoletus</i>	Uncommon resident
Bewick's Wren	<i>Catherpes mexicanus</i>	Common resident
House Wren	<i>Thryomanes bewickii</i>	Common migrant, uncommon winter
Winter Wren	<i>Troglodytes aedon</i>	Rare in winter
Marsh Wren	<i>Troglodytes troglodytes</i>	Uncommon migrant and winter
	<i>Cistothorus palustris</i>	
MUSICAPIDAE		
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	Uncommon migrant
Black-tailed Gnatcatcher	<i>Poliophtila melanura</i>	Uncommon resident
Ruby-crowned Kinglet	<i>Regulus calendula</i>	Common winter
Western Bluebird	<i>Sialia mexicana</i>	Rare or eruptive in winter
Mountain Bluebird	<i>Sialia currucoides</i>	Eruptive in winter
Townsend's Solitaire	<i>Myadestes townsendi</i>	Eruptive in winter and migration
Swainson's Thrush	<i>Catharus ustulatus</i>	Uncommon migrant
Hermit Thrush	<i>Catharus guttatus</i>	Uncommon migrant and winter
American Robin	<i>Turdus migratorius</i>	Uncommon visitor
MIMIDAE		
Northern Mockingbird	<i>Mimus polyglottos</i>	Common resident
Sage Thrasher	<i>Oreoscoptes montanus</i>	Uncommon winter
Curve-billed Thrasher	<i>Toxostoma curvirostre</i>	Common resident
Crissal Thrasher	<i>Toxostoma crissale</i>	Uncommon resident

Birds of the Empire-Cienega Planning Area, continued

Common Name (FAMILY)	Species	Occurrence
MOTACILLIDAE		
American Pipit	<i>Anthus rubescens</i>	Uncommon
Sprague's Pipit	<i>Anthus spragueii</i>	Uncommon
PTILOGONATIDAE		
Phainopepla	<i>Phainopepla nitens</i>	Common permanent resident
BOMBYCILLIDAE		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Uncommon usually late winter through early summer
LANIIDAE		
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Uncommon resident
Northern Shrike	<i>Lanius excubitor</i>	Accidental
STURNIDAE		
European Starling	<i>Sturnus vulgaris</i>	Common resident
VIREONIDAE		
Bell's Vireo	<i>Vireo bellii</i>	Uncommon summer
Gray Vireo	<i>Vireo vicinior</i>	Hypothetical
Solitary Vireo	<i>Vireo solitarius</i>	Uncommon migrant
Hutton's Vireo	<i>Vireo huttoni</i>	Uncommon visitor
Warbling Vireo	<i>Vireo gilvus</i>	Common migrant
EMBERIZIDAE		
Tennessee Warbler	<i>Vermivora peregrina</i>	Accidental
Orange-crowned Warbler	<i>Vermivora celata</i>	Uncommon migrant
Nashville Warbler	<i>Vermivora ruficapilla</i>	Uncommon migrant
Virginia's Warbler	<i>Vermivora virginiae</i>	Uncommon migrant
Lucy's Warbler	<i>Vermivora luciae</i>	Common summer
Yellow Warbler	<i>Dendroica petechia</i>	Common summer
Yellow-rumped Warbler	<i>Dendroica coronata</i>	Common winter and migrant
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	Uncommon migrant
Townsend's Warbler	<i>Dendroica townsendi</i>	Uncommon migrant
Hermit Warbler	<i>Dendroica occidentalis</i>	Uncommon migrant
American Redstart	<i>Setophaga ruticilla</i>	Rare migrant
Northern Waterthrush	<i>Seiurus noveboracensis</i>	Uncommon migrant
Common Yellowthroat	<i>Geothlypis trichas</i>	Common summer, uncommon winter
MacGillivray's Warbler	<i>Opornis tolmiei</i>	Uncommon migrant
Hooded Warbler	<i>Wilsonia citrina</i>	Rare migrant
Wilson's Warbler	<i>Wilsonia pusilla</i>	Common migrant
Painted Redstart	<i>Myioborus pictus</i>	Rare visitor
Yellow-breasted Chat	<i>Icteria virens</i>	Common summer
Hepatic Tanager	<i>Piranga flava</i>	Rare migrant
Summer Tanager	<i>Piranga rubra</i>	Common summer
Western Tanager	<i>Piranga ludoviciana</i>	Common migrant
Northern Cardinal	<i>Cardinalis cardinalis</i>	Uncommon resident
Pyrrhuloxia	<i>Cardinalis sinuatus</i>	Uncommon resident
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Rare migrant
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Common migrant
Blue Grosbeak	<i>Guiraca caerulea</i>	Common summer
Lazuli Bunting	<i>Passerina amoena</i>	Common migrant
Indigo Bunting	<i>Passerina cyanea</i>	Uncommon migrant or uncommon summer

Birds of the Empire-Cienega Planning Area, continued

Common Name (FAMILY)	Species	Occurrence
EMBERIZIDAE		
Varied Bunting	<i>Passerina versicolor</i>	Uncommon summer
Painted Bunting	<i>Passerina ciris</i>	Rare migrant
Dickcissel	<i>Spiza americana</i>	Rare migrant
Green-tailed Towhee	<i>Pipilo chlorurus</i>	Common migrant and winter
Spotted Towhee	<i>Pipilo maculatus</i>	Uncommon winter
Canyon Towhee	<i>Pipilo fuscus</i>	Common resident
Abert's Towhee	<i>Pipilo aberti</i>	Common resident
Botteri's Sparrow	<i>Aimophila botterii</i>	Uncommon summer
Cassin's Sparrow	<i>Aimophila cassinii</i>	Uncommon summer/A few in winter
Rufous-winged Sparrow	<i>Aimophila carpalis</i>	Irregular resident
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	Uncommon resident
Chipping Sparrow	<i>Spizella passerina</i>	Common winter
Brewer's Sparrow	<i>Spizella breweri</i>	Common winter
Vesper Sparrow	<i>Poocetes gramineus</i>	Common winter
Lark Bunting	<i>Calamospiza melanocorys</i>	Uncommon winter/Eruptive
Lark Sparrow	<i>Chondestes grammacus</i>	Uncommon resident
Black-throated Sparrow	<i>Amphispiza bilineata</i>	Uncommon resident
Savannah Sparrow	<i>Passerculus sandwichensis</i>	Uncommon winter
Baird's Sparrow	<i>Ammodramus bairdii</i>	Uncommon winter
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Uncommon summer and uncommon winter
Song Sparrow	<i>Melospiza melodia</i>	Uncommon resident
Lincoln's Sparrow	<i>Melospiza lincolni</i>	Common winter
Swamp Sparrow	<i>Melospiza georgiana</i>	Rare in winter
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Common winter
Dark-eyed Junco	<i>Junco hyemalis</i>	Uncommon winter
McCown's Longspur	<i>Calcarius mccownii</i>	Rare in winter
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	Uncommon in winter
Bobolink	<i>Dolichonyx oryzivorus</i>	Rare migrant
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Uncommon resident
Eastern Meadowlark	<i>Sturnella magna</i>	Common resident
Western Meadowlark	<i>Sturnella neglecta</i>	Uncommon winter
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Uncommon summer
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Uncommon winter
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	Uncommon visitor in spring
Bronzed Cowbird	<i>Molothrus aeneus</i>	Uncommon summer
Brown-headed Cowbird	<i>Molothrus ater</i>	Common summer
Hooded Oriole	<i>Icterus cucullatus</i>	Uncommon summer
Streak-backed Oriole	<i>Icterus pustulatus</i>	Accidental
Bullock's Oriole	<i>Icterus bullockii</i>	Uncommon summer
Scott's Oriole	<i>Icterus parisorum</i>	Uncommon summer
FRINGILLIDAE		
House Finch	<i>Carpodacus mexicanus</i>	Common resident
Pine Siskin	<i>Carduelis pinus</i>	Uncommon winter
Lesser Goldfinch	<i>Carduelis psaltria</i>	Common resident
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>	Eruptive in fall and winter
American Goldfinch	<i>Carduelis tristis</i>	Uncommon in winter
PASSERIDAE		
House Sparrow	<i>Passer domesticus</i>	Common resident

Birds of the Empire-Cienega Planning Area, concluded

Abundance and Residence Categories:

Common: to be expected in proper habitat. Should be encountered on most visits during proper season.

Uncommon: may or may not be encountered. Includes species that are present in low numbers and species that are present in some years but not in others.

Rare: includes species that occur some years and in very small numbers.

Accidental: includes species that have occurred only once and are not likely to occur again.

Hypothetical: includes species for which documentation is lacking or questionable.

Resident: occurs year-round.

Summer: a neotropical migrant. A species that breeds at the Empire Ranch but is absent during the winter.

Migrant: a species encountered during annual passage.

Winter: a species that breeds farther north and spends the winter in the planning area.

Irruptive: species such as corvids that occur outside their normal range or habitat in response to resource fluctuations.

Irregular: a species that uses a site without an established pattern.

6. MAMMALS WITHIN THE EMPIRE-CIENEGA PLANNING AREA

Mammals of the Empire-Cienega Resource Conservation Area

Common Name (FAMILY)	Scientific Name (Species)	Source
SORICIDAE		
Desert Shrew	<i>Notiosorex crawfordi crawfordi</i>	3
PHYLLOSTOMIDAE		
Lesser long-nosed Bat	<i>Leptonycteris curasoae yerbabuenae</i>	1, 3
Mexican long-tongued bat	<i>Choeronycteris mexicana</i>	
VESPERTILIONIDAE		
Cave Myotis	<i>Myotis velifer brevis</i>	1,3
Fringes Myotis	<i>Myotis thysanodes thysanodes</i>	1,3
California Myotis	<i>Myotis californicus californicus</i>	1,3
Southwestern Myotis	<i>Myotis auriculus</i>	1
Western Pipistrelle	<i>Pipistrellus hesperus</i>	3
Big Brown Bat	<i>Eptesicus fuscus pallidus</i>	1,3
Red Bat	<i>Lasiurus borealis</i>	1
Hoary Bat	<i>Lasiurus cinereus</i>	1
Townsend's big-eared Bat	<i>Plecotus townsendii pallescens</i>	3
Pallid Bat	<i>Antrozous pallidus pallidus</i>	1,3
LEPORIDAE		
Desert Cottontail	<i>Sylvilagus auduboni arizonae</i>	1,3
Black-tailed Jackrabbit	<i>Lepus californicus eremicus</i>	1,3
Antelope Jackrabbit	<i>Lepus alleni</i>	1
SCIURIDAE		
Harris' Antelope Squirrel	<i>Ammospermophilus harrisi</i>	3
Rock Squirrel	<i>Spermophilus variegatus</i>	1,3
Spotted ground Squirrel	<i>Spermophilus spilosoma</i>	4
GEOMYIDAE		
Botta's Pocket Gopher	<i>Thomomys bottae proximus</i>	3
Southern Pocket Gopher	<i>Thomomys umbrinus</i>	2
HETEROMYIDAE		
Silky Pocket Mouse	<i>Perognathus flavus</i>	3
Bailey's Pocket Mouse	<i>Perognathus baileyi</i>	3
Hispid Pocket Mouse	<i>Perognathus hispidus</i>	3,4
Desert Pocket Mouse	<i>Perognathus penicillatus</i>	
Rock Pocket Mouse	<i>Perognathus intermedius</i>	3
Banner-tailed Kangaroo Rat	<i>Dipodomys spectabilis</i>	1,4
Merriam's Kangaroo Rat	<i>Dipodomys merriami</i>	3,4
Ord's Kangaroo Rat	<i>Dipodomys ordii</i>	3

Mammals of the Empire-Cienega Resource Conservation Area, continued

Common Name (FAMILY)	Scientific Name (Species)	Source
MURIDAE		
Plains Harvest Mouse	<i>Reithrodontomys montanus</i>	3
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>	3
Fulvous Harvest Mouse	<i>Reithrodontomys fulvescens</i>	2,3
Cactus Mouse	<i>Peromyscus eremicus</i>	3
Deer Mouse	<i>Peromyscus maniculatus</i>	1,3
Brush Mouse	<i>Peromyscus boylii</i>	3
White-footed Mouse	<i>Peromyscus leucopus</i>	1
Northern Pygmy Mouse	<i>Baiomys taylori</i>	1,2,3
Northern Grasshopper	<i>Onychomys leucogaster</i>	3
Southern Grasshopper	<i>Onychomys torridus</i>	3
Hispid Cotton Rat	<i>Sigmodon hispidus</i>	3
Arizona Cotton	<i>Sigmodon arizonae</i>	1,4
Fulvous Cotton	<i>Sigmodon fulviventer</i>	3
Yellow-nosed cotton Rat	<i>Sigmodon ochrognathus</i>	2,3
Least Cotton Rat	<i>Sigmodon minimus</i>	5
White-throated Wood Rat	<i>Neotoma albigula</i>	1,3
ERETHRIZONTIDAE		
Porcupine	<i>Erethizon dorsatum</i>	1
CANIDAE		
Coyote	<i>Canis latrans</i>	1,3
Gray Fox	<i>Urocyon cinereoargenteus</i>	1,3
PROCYONIDAE		
Ringtail	<i>Bassariscus astutus</i>	1,3
Raccoon	<i>Procyon lotor</i>	1,3
Coati	<i>Nasua nasua</i>	1,3
MUSTELIDAE		
Badger	<i>Taxidea Taxus</i>	1
Striped Skunk	<i>Mephitis mephitis</i>	1,3
Hooded Skunk	<i>Mephitis macroura</i>	1
FELIDAE		
Mountain Lion	<i>Felis concolor</i>	1
Bobcat	<i>Felis rufus</i>	1,3
TAYASSUIDAE		
Collared Peccary (javelina)	<i>Tayassu tajacu</i>	1,3
CERVIDAE		
Mule Deer	<i>Odocoileus hemionus</i>	1,3
White-tailed Deer	<i>Odocoileus virginianus</i>	1,3
ANTILOCAPRIDAE		
Chihuahuan Pronghorn	<i>Antilocapra americana mexicana</i>	1,3

Mammals of the Empire-Cienega Resource Conservation Area, concluded

Source:

1. BLM, Tucson Office Files (1988-89)
2. Arizona Game and Fish Department Nongame Heritage Database (1964-85)
- C. Rosemont Inventory (1975-76): Davis, R. and Callahan, J.R., editors (ca. 1977). An Environmental Inventory of the Rosemont Area in Southern Arizona, Vol 1: the Present Environment. Unpublished contract reports to Anamax Mining Corp. 278p.
- D. Anderson, J.E.(1982). Hunting area preferences of raptors in rangelands. Unpublished M.S. Thesis, University of Arizona, Tucson. 29p.
- E. Bock, J.H., C.E. Bock, and J.R. McNight, 1976. A study of the effects of grassland fires at the research ranch in southeastern Arizona. Journal of the Arizona Academy of Science. Vol II: 49-57.

7. ANNOTATED CHECKLIST OF FISH, AMPHIBIANS, AND REPTILES WITHIN THE EMPIRE-CIENEGA PLANNING AREA

Fish, Amphibians, and Reptiles of the Empire-Cienega Resource Conservation Area

Common Name (FAMILY)	Scientific Name (Species)	Source
CYPRINIDAE		
Gila chub	<i>Gila intermedia</i>	1,2
Longfin dace	<i>Agosia chrysogaster</i>	1,2
Goldfish (Babocomari)	<i>Carassius auratus</i>	5
ICTALURIDAE		
Yellow bullhead ((Babocomari)	<i>Ameiurus natalis</i>	
POECILIIDAE		
Gila Topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	1,2
Mosquitofish (Babocomari)		1
CENTRARCHIDAE		
Largemouth Bass (Babocomari)	<i>Micropterus salmoides</i>	4,5
Green Sunfish (Babocomari)	<i>Lepomis cyanellus</i>	5
Bluegill (Babocomari)	<i>Lepomis macrochirus</i>	5
PELOBATIDAE		
Couch's spadefoot	<i>Scaphiopus couchii</i>	1,3
Southern spadefoot	<i>Scaphiopus multiplicatus</i>	1
BUFONIDAE		
Sonoran Desert Toad	<i>Bufo alvarius</i>	3
Great Plain's Toad	<i>Bufo cognatus</i>	3
Red-spotted Toad	<i>Bufo punctatus</i>	3
RANIDAE		
Bullfrog	<i>Rana catesbeiana</i>	1
Lowland leopard frog	<i>Rana yavapaiensis</i>	1
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	1
KINOSTERNIDAE		
Sonoran mud turtle	<i>Kinosternon sonoriense</i>	1
EMYDIDAE		
Desert Box turtle	<i>Terrapene ornata luteola</i>	1
IGUANIDAE		
Common collared lizard	<i>Crotaphytus collaris</i>	1,3
Lesser Earless lizard	<i>Holbrookia maculata</i>	1,3
Greater Earless lizard	<i>Holbrookia texana</i>	3
Clark's spiny lizard	<i>Sceloporus clarkii</i>	1,3
Tree lizard	<i>Urosaurus ornatus</i>	1,3
Short-horned lizard	<i>Phrynosoma douglassi</i>	3
Regal horned lizard	<i>Phrynosoma solare</i>	1,3

Fish, Amphibians, and Reptiles of the Empire-Cienega Resource Conservation Area, continued

Common Name (FAMILY)	Scientific Name (Species)	Source
SCINCIDAE		
Great Plains skink	<i>Eumeces obsoletus</i>	1
TEIIDAE		
Desert grassland whiptail	<i>Cnemidophorus uniparens</i>	1,3
Giant spotted whiptail	<i>Cnemidophorus burti</i>	3
Arizona desert whiptail	<i>Cnemidophorus tigris</i>	3
Sonoran spotted whiptail	<i>Cnemidophorus sonorae</i>	3
ANGUIDAE		
Madrean alligator lizard	<i>Gerrhonotus kingii</i>	1,3
HELODERMATIDAE		
Gila monster	<i>Heloderma suspectum</i>	1,3
COLUBRIDAE		
Ringneck snake	<i>Diadophis punctatus</i>	1,3
Big Bend Patch-nosed snake	<i>Salvadora hexalepis deserticola</i>	1,3
Sonoran whipsnake	<i>Masticophis bilineatus</i>	3
Coachwhip	<i>Masticophis flagellum</i>	3
Gopher snake	<i>Pituophis melanoleucus</i>	3
Green rat snake	<i>Elaphe triaspis</i>	2
Common kingsnake	<i>Lampropeltis getulus</i>	1
Checkered garter snake	<i>Thamnophis marcianus</i>	1
Mexican garter snake	<i>Thamnophis eques</i>	1
Black-necked garter snake	<i>Thamnophis cyrtopsis</i>	1,3
Chihuahuan hook-nosed snake	<i>Gyalopion canum</i>	2,3
Night snake	<i>Hypsiglena torquata</i>	3
Lyre snake	<i>Trimorphodon biscutatus</i>	3
Southwestern black-headed snake	<i>Tantilla hobartsmithi</i>	3
VIPERIDAE		
Western diamondback rattlesnake	<i>Crotalus atrox</i>	1
Mojave rattlesnake	<i>Crotalus scutulatus</i>	1,3
Rock rattlesnake	<i>Crotalus lepidus</i>	2
Black-tailed rattlesnake	<i>Crotalus molossus</i>	3

Sources:

1. BLM, Field Office Files
2. Arizona Game and Fish Heritage Database
3. Davis, R. and Callahan J.R., editors (N.D.) An environmental inventory of the Rosemont area in southern Arizona, Vol 1: The present environment unpublished contract report to Anamax Mining Corp. 278p.
4. Sheldon, D.L. and D.A. Hendrickson., 1988. Report of the October Fish Count. Arizona Game and Fish Department. Nongame Branch. Phoenix, Arizona 85023.
5. Minckley, W.L., 1985. Native fishes and natural aquatic habitats in U.S. Fish and Wildlife Service Region 2 west of Continental Divide. Report to U.S. Fish and Wildlife Service, Albuquerque, New Mexico, Department of Zoology, Arizona State University, Tempe, Arizona. 158p.

8. WILLOW FLYCATCHER HABITAT ASSESSMENT AND SURVEYS

Southwestern Willow Flycatcher Habitat Classification 2000 Summaries for Cienega Creek* and Tributaries**

Segment				Classification	Patch Size	Attributes				
Number	Location	Date (2000)	Length	S;P;N ¹	Acres	H ²	W ³	C.D. ⁴	U.D. ⁵	P.S. ⁶
59AA	Bootlegger to Narrows	7/12	1.5mi	P		S	P	P	S	P
59A	Narrows to Apache Canyon	7/12	.3	S		S	S	S	S	S
59B	Apache to Fresno Canyon	7/12	.3	S		S	S	S	S	S
59C	Fresno Canyon to Bedrock Falls	7/12	1.6	S		S	S	S	S	S
59E	Pump Canyon to Cienega Falls	7/11	.6	P		S	S	S	P	S
59F	Cienega Falls to Mattie Canyon	7/11	.5	P		S	S	S	P	S
59G	Mattie Canyon to Cold Springs	7/11	.5	p		S	S	S	P	S
59H	Cold Springs to Ag. Fields	7/11	1.0	P		S	S	S	P	S
59I	Ag. Fields to Canal	7/11	1.7	P		S	S	S	P	S
59J	Canal to Oak Tree Canyon	7/11	.9	S		S	S	S	S	S
59K	Oak Tree Canyon to Spring Water Canyon	7/11	.3	P	1500ft ²	S	S	S	P	S
59L	Spring Water Canyon to Gardner Canyon	7/11	1.0	S		S	S	S	S	S
59M	Gardner Canyon to Head Waters	7/11	1.3	P		S	S	S	P	S
62A	Empire Gulch Confluence	7/11	1.0	P		S	S	P	P	S
62D	Empire Gulch Spring-down stream	7/11	1.3	P		S	S	S	P	S

* 59AA-59M

** 62A;62D

1. S - Suitable; P - Potential; N - Not SWIFL Habitat 4. Canopy Density

2. Height

5. Understory Density

3. Width

6. Patch Size

Willow Flycatcher Survey Results (1994-2000) Cienega Creek

Stream Reach	Birds Detected? (Y/N)	Year Surveyed
Mattie Canyon to Cold Water Spring (59G)	No	1994
Ag. Fields to Canal (59I)	No (all years)	1994, 1998, 1999, 2000
Canal to Oak Tree Canyon (59J)	No	1994
Oak Tree Canyon to Spring Water Canyon (59K)	No	1994
Gardner to Head Waters (59M)	No	1994

9. SPECIAL STATUS SPECIES SUMMARIES

Note: Descriptions of federally listed and candidate species can be found in Chapter 3.

Proposed Wildlife of Special Concern

Mexican garter snake (*Thamnophis eques*) - This species occupies perennial streams and permanent marshes at mid-elevations in central, south-central, and southeastern Arizona. It feeds primarily on fish and amphibians. Threats include predation by introduced exotics such as bullfrogs and habitat loss and degradation (AGFD 1996). There is suitable habitat along Cienega Creek. Mexican garter snakes occur along Cienega Creek and in tributaries in the planning area (BLM files). A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Bunch grass lizard (*Sceloporus scalaris*) - This species is found in oak woodland, canyons, and montane forests of southeastern Arizona. Occasionally it is found in low-elevation grasslands. It frequents habitats with bunch grass. Threats include overgrazing of bunch grass habitat (AGFD 1996). This species is a likely inhabitant of grasslands above 4,000 feet within the planning area. It has been found at higher elevations in the Whetstone Mountains adjacent to the planning area (Turner and others 1999).

Lowland leopard frog (*Rana yavapaiensis*) - Occurs below 5500 feet elevation, south and west of Mogollon Rim in Arizona. This species occupies permanent waters, apparently preferring streams over ponds and other aquatic habitats. It has disappeared from most of lower Gila and lower Colorado river systems, and declines have also occurred in south central and southeastern Arizona. Threats include predation by non-native species such as bullfrogs, loss and degradation of habitats, and human uses of habitats (AGFD 1996). The planning area has suitable habitat along Cienega Creek and its tributaries. Lowland leopard frogs are present along Cienega Creek and at off-channel ponds in the floodplain (BLM files). A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Azure bluebird (*Sialia sialis fulva*) - This is a Mexican sub-species of the Eastern bluebird. It occupies pine-oak forests of southeastern Arizona at elevations of 3280-6560 ft (Latta and others 1999). Azure bluebirds primarily utilize oaks including Emory, Arizona white, silverleaf and Mexican Blue oak tree species. They are frequently found in forest edges, areas with open canopy and scattered trees, as well as burned or cut woodland. They are a second cavity nester and utilize areas with high snag densities. Birds forage and nest in mature to late succession forest patches. Azure bluebirds are usually found in the mountains but have been documented at lower elevations in Patagonia, nesting in cottonwoods. In winter small flocks can wander and can sometimes be found in Tucson (Latta and others 1999). Threats include fuelwood harvesting and loss or degradation of higher elevation riparian habitats (AGFD 1996). During winter, there is the potential for flocks to travel onto the planning area from the Whetstone mountains.

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) - This species is found in low elevation riparian areas with highest densities associated with cottonwood/willow communities with a canopy greater than 40 feet (Latta and others 1999). Potentially, they may utilize thick areas of mesquite bosque habitat. It feeds on beetles, grasshoppers, crickets, cicadas, and caterpillars. Threats include loss or degradation of native riparian habitat (AGFD 1996). Suitable habitat occurs along Cienega Creek in the planning area, and yellow-billed cuckoos are present. A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Ferruginous hawk (*Buteo regalis*) - This species is found in high elevation grasslands and breeds in northern Arizona grasslands. Nests in juniper, rock outcrops or on open ground. In Arizona they can be found in open scrublands and woodlands, grasslands, semi-desert grasslands and agricultural areas in winter or during migration (Latta and others 1999). Threats include prairie dog control programs, human disturbance near nests, and urban expansion into grasslands (AGFD 1996). The Ferruginous hawk is an occasional visitor to the planning area where it forages in grassland habitats.

Northern Goshawk (*Accipiter gentilis atricapillus*) - In the southwest this species is found primarily in ponderosa pine and mixed conifer forests. Studies in Arizona showed that adults tend to winter in ponderosa pine and pinyon-juniper forests. Nests predominately in mature stands of coniferous forests in northern, north-central, and eastern Arizona. Threats include loss and/or modification of nesting habitat due to timber management and wildfires (AGFD 1996). There is potential for occasional vagrant visits to the planning area.

Swainson's Hawk (*Buteo swainsoni*) - This species thrives in open grassland or open agricultural areas with scattered tall trees or trees along riparian habitat for nesting and roosting (Latta and others 1999). In Arizona, breeds primarily in the southeastern and northwestern grasslands. In southeastern grasslands, nests have been found in mesquite, soaptree yucca, cottonwood, and western soaptree. IT feeds primarily on insects and small mammals. Migrates the farthest of all North American hawks, traveling as far south as Argentina. Threats include pesticide use in South America, loss of nesting sites due to brush clearing and possible loss of foraging habitat due to grassland conversion (AGFD 1996). The planning area provides suitable habitat for Swainson's hawk and nesting has been documented (BLM files). A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Green Kingfisher (*Chloroceryle americana*) - A locally rare resident, nesting along San Pedro River and Sonoita Creek. Nesting documented from mid-May to mid-July. This species prefers small shady perennial streams that provide roosts over the water (Phillips and others 1964). Threats include degradation and loss of native riparian habitat (AGFD 1996). The planning area provides suitable habitat and this species is a rare to common visitor.

Sprague's pipit (*Anthus spragueii*) - This species winters mainly in desert grasslands of southeastern Arizona. It arrives on wintering grounds by mid-October and is usually gone by early April. It prefers grassland habitat with dense herbaceous vegetation and grassy agricultural fields. Threats include overgrazing (especially during drought years), shrub invasion, and urban development (AGFD 1996). The planning area provides suitable habitat and a wintering population is present.

Baird's sparrow (*Ammodramus bairdii*) - This species prefers non-grazed to lightly grazed short-grass and mid-grass habitat free of trees or shrubs for their wintering and breeding grounds. They prefer rolling hills for wintering ground. Light to moderate grazing is tolerated but heavy grazing can result in winter mortality due to loss of thermal cover. This species is most common in non-grazed areas and almost absent where grazing is more than moderate (Latta and others 1999). Threats include overgrazing grasslands (during drought years), shrub invasion and agricultural and urban development in southeastern Arizona (AGFD 1996). The planning area provides suitable habitat and wintering populations are present.

Arizona grasshopper sparrow (*Ammodramus savannarum ammoregus*) - The primary breeding range of this sub-species is restricted to southeastern Arizona and northern Sonora, Mexico. This species prefers un-grazed mid-height grasslands free of trees and shrubs (Latta and others 1999). Breeding is initiated with the onset of summer rains in July. Threats include urban, agricultural, and road development, overgrazing of grasslands (especially during drought years), and shrub invasion of grasslands (AGFD 1996). *A.s. ammodramus* is fairly common on lightly grazed pastures within the planning area.

Western red bat (*Lasiurus blossevillei*) - This species is found along waterways with broad-leaved deciduous riparian or woodland habitat present. In Arizona, primarily occurs along central and southeastern riparian corridors among walnut, sycamores, and cottonwoods at elevations from 2500 to 7000 feet. They roost singly or in small family groups (female and off-spring) among dense clumps of foliage with thick over-story and open under-story. Prey items include moths and flies, beetles, cicadas, crickets, and flying ants. Pups are born in late May to mid-June. Threats include loss of riparian and other broad-leaved deciduous forests and woodlands (AGFD 1996). They are thought to be a summer resident only. Suitable habitat occurs along Cienega Creek in the planning area and Western red bat are present (BLM files). A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Townsend's big-eared bat (*Plecotus townsendii*) - This species is found in variety of habitats including deserts, woodland and pine forests. In Arizona it is widespread but not common. It is rare in northeastern grasslands and southwestern desert habitats of Arizona. It utilizes open mines and caves as day roosts and may roost at night in abandoned buildings. Foraging occurs in uplands and over water and prey is almost entirely moths (AZ Wildlife Views 1993). It winters in cold caves, lava tubes and mines mostly in upland and mountain locations. Threats include human disturbance at major maternity roosts; renewed mining, and closure or sealing of abandoned mines used as roosts (AGFD 1996). Suitable foraging habitat is present within the planning area and Townsend's big-eared bats have been documented within the planning area. No maternity roosts or hibernacula are known within the planning area. A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Black-tailed prairie dog (*Cynomys ludovicianus*) - Extirpated from Arizona. This species is found in open desert grasslands and formerly occurred in plains grasslands of southeastern Arizona. It commonly feeds on short-grass species including buffalo grass (*Buchloe dactyloides*) and blue gramma (*Bouteloua gracilis*) (Van Pelt 1999). This species has been extirpated from the planning area, but the area provides potentially suitable habitat and this species is being considered for reintroduction.

BLM Sensitive Species

Longfin dace (*Agosia chrysogaster*) - This species is found throughout the Gila River basin in Arizona and occupies a variety of habitats from clear, cool high-elevation brooks to small low-desert streams with a sand or gravel substrate (Minckley 1973). It is typically found below 5000 feet elevation. Longfin dace are omnivorous and opportunistic. The major threat to the species is loss of extensive areas of suitable habitat and specifically loss of small, sandy stream habitat (Pima County 2000). Longfin dace are present in Cienega Creek within the planning area (BLM files). A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Texas horned lizard (*Phrynosoma cornutum*) - This species occurs from the Mississippi river region west to extreme southeast Arizona (Stebbins 1985). It inhabits arid and semi-arid open country with sparse plant growth. This species is found in semidesert grassland and plains grassland communities in southeastern Arizona. It eats chiefly ants but also takes beetles and grasshoppers. A Texas horned lizard was observed at the southeast corner of the Whetstone mountains (Turner and others 1999), and are also present in grassland northwest of the Whetstone mountains (Karen Simms, BLM biologist, personal communication).

Gray hawk (*Buteo nitidus*) - This species is found in wooded lowland streams in southeastern Arizona (Phillips and others 1964). Gray hawks arrive in nesting areas beginning in mid-March and depart for wintering areas in Mexico by mid-October. Nearly all gray hawk nesting areas in the United States are in Arizona, where about 55 pairs are known mainly from the San Pedro and Santa Cruz rivers. Gray hawks nest in cottonwood

willow galleries adjacent to mesquite woodlands. Threats include recreational disturbance and habitat destruction or modification (Glinski and others 1988). The planning area provides suitable habitat and grey hawk populations are increasing (BLM files).

Western burrowing owl (*Athene cunicularia hypugaea*) - The subspecies occurring in Arizona is one of up to 18 subspecies ranging from southern Canada through South America (Pima County 2000). Burrowing owls occupy flat unplowed prairies, grasslands, deserts, dikes and farms with existing burrows made by prairie dogs, banner tailed kangaroo rats and other mammals (Phillips and others 1964). Threats include loss of habitat from urban development, reductions in nest sites from decreases in burrowing mammal populations and effects of insecticides or rodenticides (Pima County 2000). Suitable habitat is present in the planning area. Historically communities were common in the planning area but have decreased to occasional occurrences. A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Loggerhead shrike (*Lanius ludovicianus*) - This species is found in open country with scattered trees, shrubs, low scrub, and deserts with adequate perching material including lookout posts and wires. It nests in bushes and trees (Phillips and others 1964). Suitable habitat is present in the planning area and this species is a common winter resident.

Southwestern cave myotis (*Myotis velifer brevis*) - This species is found in Arizona within desert scrub communities of creosote, brittlebush, paloverde and various cacti between 300 and 5000 feet elevation. Summer congregations occur mostly in caves, tunnels, bridges, mines and sometimes in buildings near water. Arizona populations spend the winter hibernating in caves above 6,000 feet and others travel to the highlands of Mexico (Hoffmeister 1986, Barbour and Davis 1969). Threats include disturbance by humans at roosts and closure of abandoned mines (AGFD 1993). Suitable foraging habitat is present within the planning area and presence of the species has been documented (BLM files). No maternity roosts or hibernacula are known within the planning area.

Fringed myotis (*Myotis thysanodes*) - This species is found in a variety of habitats including low deserts, grasslands, oak woodland, ponderosa pine and spruce-fir forests throughout western North America (Barbour and Davis 1969). It prefers oak woodland habitat but forages out into surrounding habitats. Day and night roost sites include open mines, caves and buildings. During the summer this species is widespread in Arizona except in the southwestern region. It winters in the northwest and southeast corners of Arizona (Hoffmeister 1986). Suitable foraging habitat is present in the planning area and presence of the species has been documented (BLM files). No maternity roosts or hibernacula are known within the planning area.

California leaf-nosed bat (*Macrotus californicus*) - This species is predominately found in southwestern Arizona in Sonoran and Mohave desert scrub, but is occasionally found in the Chihuahuan and Great Basin deserts (Hoffmeister 1986). Day roosts include mines and caves and night roosts include mines, bridges, open buildings, cellars and porches. California leaf-nosed bats remain active in the same area year round and unlike many bats do not hibernate or migrate. They primarily eat insects including grasshoppers, cicadas, beetles, butterflies, and caterpillars (Barbour and Davis 1969). Threats include human disturbance at roosts and closure of abandoned mines or buildings being used as roosts (AGFD 1993). Suitable foraging habitat is present in the planning area and presence of the species has been documented (BLM files). A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

Mexican long-tongued bat (*Choeronycteris mexicana*) - This species occurs in the United States only in southeastern Arizona and extreme southwestern New Mexico during the summer and early fall (Barbour and Davis 1969). In Arizona, it has been found from the Chiricahua mountains to the Santa Catalina mountains to the Baboquivari mountains. In Arizona, it is found generally in oak-pine habitats at 4,000-6,000 feet although it

has been documented in saguaro-paloverde desert scrub (Hoffmeister 1986). Typical roost sites are open mines and caves and usually less than a dozen individuals are present in a roost. Agave nectar is a common component of its diet. Within the roosts, Mexican long tongued bats are usually found in the dimly lighted zone near the entrance to a roost. Threats include human disturbance of roosts and habitat loss such as over harvest of agaves in Mexico (AGFD 1993). Suitable foraging habitat and roost sites are present within the planning area, and the species has been documented to occur within the planning area (BLM files). A priority vulnerable species in Sonoran Desert Conservation Plan (Pima County 2000).

10. SPLIT-ESTATE LANDS*

Empire-Cienega Planning Area Split-estate lands

T18S, R17E	
Sec. 5, lot 7, lot 13	76.83
Sec. 3, lots 1 - 8 incl., S½SE¼	303.85 <i>State</i>
Sec. 1, S½NW¼, lots 5 -9 incl.	176.33 <i>State</i>
Sec. 9	@250
Sec. 8, lots 1,2,3,5,6,7	222.17
Sec. 18, lots 3,4, SESW, SESESE, N½N½SE	@190
Sec. 17, lots 4,5,8, SE¼, S½SW¼, NESW, N½NWSW	369.45
Sec. 19, lots 1,2, E½NW¼, SESW, N½SE¼, SESE	317.99
T18S, R16E	
Sec. 24, lots 1 - 4 incl., NW¼, W½NE¼	348.00
T18 S, R18E	
Sec. 5, E½	320.00
T19S, R18E	
Sec. 23, N½NE¼, SENE	120.00
Sec. 15, SWSW	40.00
Sec. 22, E½W½	160.00
Sec. 25 E½	320.00
T20S, R17E	
Sec. 13, SE¼, E½SW¼	240.00
Sec. 24, NENE, NENW	80.00
T20S, R18E	
Sec. 10, S½SW¼	80.00
Sec. 12, SE¼	160.00
Sec. 13, NE¼	160.00
Sec. 14, NE¼, N½NW¼, SENW, N½SE¼, SESE, S½SW¼	480.00 <i>State</i>
Sec. 15, N½NE¼	80.00 <i>State</i>
Sec. 23, NE¼	160.00 <i>State</i>
Sec. 24, NW¼, N½SW¼	240.00 <i>State</i>
T20S, R19E	
Sec. 15, N½, N½S½	480.00
Sec. 20, NE¼, E½SW¼, W½SE¼	320.00
Sec. 21, NW¼	160.00
Sec. 29, E½NW¼, W½NE¼	160.00
T21S, R18E	
Sec. 14, lot 4	34.89
Sec. 15, NESE	40.00
Sec. 23, S½	320.00
T21S, R19E	
Sec. 11, lots 1 - 3 incl., W½NE¼, E½NE¼, NWSE, NESW, SENE, NESE	425.20
Sec. 19, lots 2,3,4,6, and 7, SW, SENW, S½SWNW, NWSWNW, SWNWNW, SENENW, SENWNENW, E½SWNENW, S½NENENW	432.33
Total 7167.04	

*State means State Trust Land surface, all others are private surface.

Sec. 14, lot 4	34.89
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11. LIST OF SCIENTIFIC PLANT AND ANIMAL NAMES USED IN THIS DOCUMENT

Common Name	Scientific Name
PLANTS	
Trees	
Apache pine	<i>Pinus engelmannii</i>
Arizona black walnut	<i>Juglans major</i>
Arizona white oak	<i>Quercus arizonica</i>
Arizona rosewood	<i>Vauquelinia californica</i>
Chihuahuan pine	<i>Pinus leiophylla</i>
Douglas fir	<i>Pseudotsuga menziesii</i>
Emory oak	<i>Quercus emoryi</i>
Fremont's cottonwood	<i>Populus fremontii</i>
Goodding willow	<i>Salix gooddingii</i>
netleaf hackberry	<i>Celtis Reticulata</i>
mesquite	<i>Prosopis glandulosa</i>
Mexican blue oak	<i>Quercus oblongifolia</i>
Mexican pinyon	<i>Pinus cembroides</i>
silverleaf oak	<i>Quercus hypoleucoides</i>
velvet ash	<i>Fraxinus pennsylvanica</i>
Shrubs and Cactus	
beargrass	<i>Nolina</i> spp.
burroweed	<i>Isocoma tenuisecta</i>
century plant (agave)	<i>Agave</i> spp.
cholla	<i>Cholla</i> spp.
false mesquite	<i>Calliandra eriophylla</i>
fourwing saltbush	<i>Atriplex canescens</i>
manzanita	<i>Arctostaphylos</i> spp.
mountain mahogany	<i>Cercocarpus montanus</i> var. <i>glaber</i>
needle spined pineapple cactus	<i>Echinomastus [= Neolloydia] erectocentrus</i> var <i>erectocentrus</i>
ocotillo	<i>Fouquieria splendens</i>
Palmer agave	<i>Agave palmeri</i>
prickly pear	<i>Opuntia</i> spp.
range ratany	<i>Krameria parvifolia</i>
seepwillow	<i>Baccharis salicifolia</i>
shrubby buckwheat	<i>Eriogonum wrightii</i>
silk tassel	<i>Garrya wrightii</i> Torr.
skunkbush	<i>Rhus trilobata</i>
snakeweed	<i>Gutierrezia sarothrae</i>
soaptree yucca	<i>Yucca elata</i>
turbinella oak	<i>Quercus turbinella</i>
yucca	<i>Yucca</i> spp.
whitethorn	<i>Acacia constricta</i>
Grasses and Grasslike Plants	

Common Name	Scientific Name
Arizona cottontop	<i>Trichachne californica</i>
alkali sacaton	<i>Sporobolus airoides</i>
big sacaton	<i>Sporobolus wrightii</i>
black grama	<i>Bouteloua eriopoda</i>
blue grama	<i>Bouteloua gracilis</i>
bullgrass	<i>Muhlenbergia emersleyi</i>
bulrushes	<i>Scirpus</i> spp.
bush muhly	<i>Muhlenbergia porteri</i>
cane beardgrass	<i>Andropogon barbinodis</i>
cane bluestem, cane beardgrass	<i>Bothriochloa barbinodis</i>
cattail	<i>Typha latifolia</i> , <i>Typha domingensis</i>
spiked crinkleawn	<i>Trachypogon spicatus</i>
deergrass	<i>Muhlenbergia rigens</i>
green sprangletop	<i>Leptochloa dubia</i>
hairy grama	<i>Bouteloua hirsuta</i>
lehmann lovegrass	<i>Eragrostis lehmanniana</i>
plains bristlegrass	<i>Setaria grisebachii</i>
plains lovegrass	<i>Eragrostis intermedia</i>
prairie junegrass	<i>Koeleria macrantha</i>
rushes	<i>Juncus</i> spp.
sedges	<i>Carex/Cyperus</i> spp.
sideoats gramma	<i>Bouteloua curtipendula</i>
slender grama	<i>Bouteloua filiformis</i>
spike rushes	<i>Eleocharis</i> spp.
sprucetop grama	<i>Bouteloua chondrosioides</i>
squirreltail	<i>Sitanion hystrix</i>
Texas little bluestem	<i>Schizachyrium cirratum</i>
Texas timothy	<i>Phleum pratense</i>
three-awns	<i>Aristida</i> spp.
tobosa	<i>Hilaria mutica</i>
vine mesquite grass	<i>Panicum obtusum</i>
wolftail	<i>Lycurus phleoides</i>
woolyspike balsamscale	<i>Elionurus barbiculmis</i>
Forbs	
Canelo lady tresses orchid	<i>Spiranthes delitescens</i>
horned pond-weed	<i>Zannachellia palustris</i>
Huachuca golden aster	<i>Heterotheca rutteri</i>
Huachuca water umbel	<i>Lilaeopsis schaffneriana</i> ssp. <i>recurva</i>
penny-wort	<i>Hydrocotyle verticillata</i>
speedwell	<i>Veronica</i>
stonewort	<i>Chara</i> spp.
water parsnip	<i>Berula erecta</i>
yerba mansa	<i>Anemopsis californica</i>
ANIMALS	
Fish	

Common Name	Scientific Name
Gila Chub	<i>Gila intermedia</i>
Gila topminnow	<i>Poeciliopsis occidentalis</i>
Longfin dace	<i>Agosia chrysogaster</i>
Amphibians and Reptiles	
Bunch grass lizard	<i>Sceloporus scalaris</i>
Chiricahua leopard frog	<i>Rana chiricahuensis</i>
Great plains narrow-mouthed toad	<i>Gastrophyrne olivacea</i>
Green rat snake	<i>Elaphe subocularis</i>
Lowland leopard frog	<i>Rana yavapaiensis</i>
Mexican garter snake	<i>Thamnophis eques</i>
Sonoran Mud Turtle	<i>Kinostemon sonoriense</i>
Birds	
American redstart	<i>Setophaga ruticilla</i>
Arizona grasshopper sparrow	<i>Ammodramus savannarum ammodramus</i>
Azure bluebird	<i>Sialia sialis fulva</i>
Baird's sparrow	<i>Ammodramus bairdii</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Black-capped gnatcatcher	<i>Polioptila nigriceps</i>
Black-shouldered kite	<i>Elanus caeruleus</i>
Buff-breasted flycatcher	<i>Empidonax fulvifrons</i>
Ferruginous hawk	<i>Buteo regalis</i>
Great blue heron	<i>Ardea herodias</i>
Green kingfisher	<i>Chloroceryle americana</i>
Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>
Northern goshawk	<i>Accipter gentilis</i>
Northern gray hawk	<i>Buteo nitidus maximus</i>
Osprey	<i>Pandion haliaetus</i>
Rose-throated becard	<i>Pachyramphus aglaiae</i>
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>
Sprague's pipit	<i>Anthus spragueii</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Thick-billed kingbird	<i>Tyrannus crassirostris</i>
Tropical kingbird	<i>Tyrannus melancholicus</i>
Virginia rail	<i>Rallus limicola</i>
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>
Mammals	
Antelope jack rabbit	<i>Lepus alleni</i>
Black-tailed jack rabbit	<i>Lepus californicus eremicus</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>
Bobcat	<i>Felis rufus</i>
California leaf-nosed bat	<i>Macrotus californicus</i>
Chihuahuan pronghorn	<i>Antilocapra americana mexicana</i>
Coati	<i>Nasua nasua</i>
Cottontail rabbit	<i>Sylvilagus auduboni arizonae</i>

Common Name	Scientific Name
Coyote	<i>Canis latrans</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Greater western mastiff bat	<i>Eumops perotis californicus</i>
Grizzly bear	<i>Ursus arctos</i>
Jaguar	<i>Felis onca</i>
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuenae</i>
Mexican long-tongued bat	<i>Choeronycteris mexicana</i>
Mexican wolf	<i>Canis lupus baileyi</i>
Mountain lion	<i>Felis concolor</i>
Mule deer	<i>Odocoileus hemionus</i>
Porcupine	<i>Erethizon dorsatum</i>
Raccoon	<i>Procyon lotor</i>
Ringtail	<i>Bassariscus astutus</i>
Southwestern cave myotis	<i>Myotis velifer brevis</i>
Townsend's big-eared bat	<i>Plecotus townsendii</i>
Western red bat	<i>Lasiurus blossevillii</i>
White-tailed deer	<i>Odocoileus virginianus</i>

APPENDIX 4

Cumulative Impact Assumptions

Management of Intermixed Lands

State Trust Lands

It is assumed that, in the short-term, the Arizona State Land Department will continue to manage State Trust lands in the watershed for short term/highest economic benefit including issuing leases/permits for mining, grazing, recreation, rights-of-ways and commercial purposes.

In the long term, it is assumed that the State Land Department would consider selling State Trust land in the watershed for development purposes (real estate/commercial).

At the time of preparation of this EIS, several initiatives were being proposed to amend the Arizona State Constitution to shift the emphasis on some State Trust lands to conservation use. Should such an initiative pass in the future, then some or all of the intermixed State Trust Lands in the planning area might be considered for this category in the long-term. Depending on the wording of the initiative, uses such as grazing and recreation might continue on these selected lands, but sale of land or issuance of commercial leases would be unlikely to occur.

BLM could purchase State Trust lands or conservation easements in the planning area if resources became available but could not acquire lands through exchange unless authorized by legislation amending the State Constitution.

Forest Service Lands

It is assumed that in the short and long term that the Forest Service will continue to manage land for multiple uses/sustained yield including grazing, mining, recreation, wildlife, etc. and that in the short-term, the Forest Service will continue to make minor land use adjustments to block up forest lands and reduce inholdings (Including additional lands going to private along the eastern Forest Boundary in the Santa Rita Mountains).

Over the long-term, the Forest Service may change some current management strategies to meet the goals/objectives developed by the Sonoita Valley Planning Partnership through Forest Plan Revision or Amendment.

Private Lands

It is assumed that in the short-term, surrounding private lands will be a mix of large ranches and smaller “ranchettes” (<40 acres).

In the long-term, economic/social pressures to sell off ranches for development would likely increase and higher density development would occur.

Growth management strategies developed by the Sonoita Crossroads Community Forum and other local-driven growth management and planning efforts may result in opportunities for preservation of open space and conservation of natural resources through strategies such as purchase of conservation easements and purchase of development rights.

BLM could acquire private lands or conservation easements in the planning area from willing sellers through donation, exchange, or purchase if resources became available.

APPENDIX 5

LAS CIENEGAS RMP MAILING LIST

Las Cienegas RMP Mailing List

First Name	Last Name	Title	Organization
Elected Official - Federal			
J.D.	Hayworth	Congressman	
Jim	Kolbe	Congressman	
Jon	Kyl	Senator	
John	McCain	Senator	
Bob	Stump	Representative	
Elected Official - Local			
<i>City of Tucson</i>			
Jerry	Anderson	Ward Three, Council Member	
Jose	Ibarra	Ward One, Council Member	
Steve	Leal	Ward Five, Council Member	
Fred	Ronstadt	Ward Six, Council Member	
Shirley	Scott	Ward Four, Council Member	
Robert	Walkup	Mayor	
Carol	West	Ward Two, Council Member	
<i>Pima County - Board of Supervisors</i>			
Sharon	Bronson	District 3, Vice Chair	
Ray	Carroll	District 4	
Ann	Day	District 1	
Dan	Eckstrom	District 2	
Raul	Grijalva	District 5, Chairman	
<i>Santa Cruz County - Board of Supervisors</i>			
Robert	Damon	District 2	
Ronald R.	Morris	District 3	
Roberto	Rojas	District 1	
<i>Cochise County - Board of Supervisors</i>			
Lois	Backe	Budget Officer	
Victoria	Christiansen	Secretary Senior	
Jody N.	Klein	County Administrator	
Maria G.	Marsh	Assistant to the Clerk	
Nadine M.	Parkhurst	Clerk of the Board	Cochise County

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
Elected Official - State			
Don	Aldridge	Representative	
Debra	Brimhall	Representative	
Jack	Brown	Senator	
Jim	Carruthers	Representative	
Harry	Clark	Representative	
Pat	Conner	Senator	
Franklin	Flake	Representative	
Joe	Hart	Representative	
Jane	Hull	Governor	
Sue	Lynch	Representative	
Bob	McLendon	Representative	
Rebecca	Rios	Representative	
Peter	Rios	Senator	
Carol	Springer	Senator	
John	Verkamp	Representative	
John	Wettaw	Senator	
Government - Federal			
			Air Force Pentagon
			Directorate of Env. Qlty.
			Federal Highway Administration
			Kaibab Nat'l Forest
			Lake Mead Nat'l Recreation Area
			Mineral Mang. Service
			Natural Resource Conservation Service, USDA
			Nat'l Park Service
			U.S. Air Force 56 CES/CEVN
			U.S. Bureau of Indian Affairs (BIA)
			U.S. Bureau of Land Mgmt. (BLM)
			U.S. Bureau of Reclamation (BOR)
			U.S. Dept. of Agriculture (USDA)
			U.S. Dept. of Army, Corps of Eng
			U.S. Dept. of Army, Ft. Huachuca Wildlife
			U.S. Dept. of Energy
			U.S. Env. Protection Agency (EPA)
			U.S. Fish & Wildlife Service (USFWS)
			U.S. Forest Service (USFS)
			Coronado Nat'l Forest
			Prescott Nat'l Forest
			Tonto Nat'l Forest
			Mesa R.D. Tonto Nat'l Forest

First Name	Last Name	Title	Organization
			U.S. Geological Survey (USGS)
			U.S. National Park Service
		Government - Local	
			Central AZ Assoc. of Gov.
			City of Sierra Vista
			City of Tucson
			Eastern AZ Counties Org.
			Park Recreation & Library Dept. of Tucson
			Pima Co. Dept. of Civil Works
			Pima Co. Dept. of Transptn.
			Pima Co. Devlp. Brd. & Visitor Ctr.
			Pima Co. District Library
			Pima Co. Economic Dev.
			Pima Co. Land Use Committee
			Pima Co. Recreation Service
			Pima Co. Parks & Recreation
			Pima Co. Sheriff's Mounted Posse
			Pima Co. Wastewater Mang.
			Santa Cruz Co., Planning Dept.
			Southeastern AZ Gov. Org.
			SW Land Exchange Project
			Tucson Chamber of Com.
			Tucson Fire Dept.
			Tucson Library
			Tucson Police Dept.
		Government - State	
			ASU AZ Mineral Assn.
			ASU, Center for Env. Studies
			ASU Chapter of the Wildlife
			ASU-Dept. of Anthropology
			ASU-Dept. of Plant Biology
			ASU, Dept. of Zoology
			ASU, Office of Cultural Resource
			AZ Arch Council & State Museum
			AZ Commission of Indian Affairs
			AZ Dept. of Env. Quality (ADEQ)
			AZ Dept. of Water Resources (ADWR)
			AZ Game & Fish Dept. WM-HB
			AZ Geological Survey
			AZ State Clearinghouse
			AZ State Land Dept. (ASLD)

First Name	Last Name	Title	Organization
			State Land Commissioner
			AZ State Mine Inspector's Office
			AZ State Parks
			OHV Coordinator
			AZ Trail Coordinator
			AZ State Parks Board
			Central AZ Project
			GR & Canyon University
			Natural Resources
			NAU, Cline Library
			NAY, School of Forestry
			Northwestern University
			Office of Attorney General
			Olympic State Park
			Soil & Water Conservation
			U of A Administration 412
			U of A, College of Law
			U of A School o Renewable Nat. R
			UC Davis
			University of AZ (U of A)
		Government - Tribal	
			Ak-Chin Indian Community Env.
			Broadway/Gap Charter-Western
			Ft. McDowell Mohave-Apache Indian Comm.
			Kaibab-Paiute Council
			Office of Hopi Lands, the Hopi Tribe
			Pascua Yaqui Tribe
			Salt River Pima-MCPA Indian Comm.
			San Carlos Apache Tribe
			Tohono O'odham Nation
			Yavapai-Apache Community
		Media	
			ANRN
			Associated Press
			AZ Daily Star
			AZ Daily Sun
			Arizonian Weekly Bulletin
			Bumpy Road News
			Copper Basin News
			Daily Dispatch
			Freelance Writer
			Green Valley News & Sun
			Lake Powell Chronicle

First Name	Last Name	Title	Organization
			Mesa Tribune
			Nogales International
			Phoenix Gazette
			Tucson Citizen
		Non-Government Organization	
			American Fisheries Society
			Amigos
			Audubon Society
			AZ Antelope Foundation
			AZ-Archaeological Society
			AZ Assoc. of 4-Wheel Drive Club
			AZ Cattle Growers Assn.
		Non-Government Organization	
			AZ Rough Riders
			AZ State Assn. Of 4-Wheel Drive
			AZ State Rifle
			AZ Trail Assoc.
			AZ Wilderness Coalition
			AZ Wildlife Federation
			AZ Wool Producers Assn.
			Bullhead 4 Wheelers
			Center for Biological Diversity
			Cochise Co. Rough Riders
			Colorado River
			Co. Line Riders
			Co. SPRVSRE Assn.
			Copper State 4-Wheel Drive Club
			Council for Sustainable Living
			Creepy Crawlers 4 Wheeler Drive
			Defenders of Wildlife
			SW Rep., Defenders of Wildlife
			Desert Fishes Council
			Friends of Animals
			Friends of AZ Rivers
			Friends of Pronatura
			Forest Guardians
			Fund for Animals
			Garrett 4 WDC/AWA4WDC
			Glendale Hiking Club
			Greater AZ Bicycling Assn.
			Greater Phoenix Brittany Club
			Hassayampa River Preserve
			Huachuca Hiking Club

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
			Havasut 4-Wheelers
			Hualapai 4-Wheelers
			Imprinting Foundation
			Internat'l Sonoran Desert Alliance
			Int'l Soc. of Protection of Mustangs
			Lands Foundation
			Lions Internat'l. (AZ)
			Mesa 4-Wheelers
			Minerals Exploration Coalition
			Mohave Prospectors Assn.
			Mohave Co. Trails Assn., Inc.
			Motorola Dust Devils 4-Wheelers
			NOHUCC/AUHUA
			North American Bear Society
			Oracle Trails Coalition
			Roadrunner 4-Wheelers
			Pebble Pickin Posse
			People for the West
			Pima NRCD
			Pima Trails Association
			Rio Salado Vizla Club
			Research Ranch
			Rincon Institute
			Sahuaro 4X4's Sahuaro Brittany Club
			Santa Cruz Cnty. Fair & Rodeo Assn.
			Sierra Club-Rincon Group
			Sky Island Alliance
			Superstition Area Land Trust
			Southern Arizona Guides & Outfitters
			So. AZ Wildlife Callers
			Sonoita Bird Dog Club
			Sonoran Institute
			Southern Arizona Hiking Club
			Southern AZ G-S Pointer Club
			State Land Interface & United Dir.
			The Nature Conservancy
			Arizona Chapter
			Ramsey Cyn Preserve
			Tucson Amateur Astronomy
			Tucson Audubon Society
			Tucson Orienteering Club
			Tucson Rod & Gun Club
			Tucson Saddle Club

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
			Verde Valley 4-Wheel Drive Club
			Walapai 4-Wheelers
			Whittell Wildlife Trust
			Wilderness Land Trust
			Wildlife Society-AZ Chapter
			Yarnell Senior Citizens Center
		Private	
			Asarco, Inc.
			Asarco-SW Mining Division
			Boyce Thompson Arboretum
			Chambers Group
			Crown C Ranch
			El Paso Natural Gas Co.
			Empire Ranch Prop Owners
			Empire Rita Ranch
			Empire Valley
			Fossil Energy
			Helvetia Ranch
			High Haven Ranch
			McGann & Associates, Inc.
			M & K Associates
			Oakdale Ranch
			Rosemont Asarco, Inc.
			R/W Agent, AEPCO
			Phoenix Zoo
			Santa Fe Ranch
			Santa Rita Abbey
			Singing Valley Ranch
			S-Lazy J
			SW Minerals Explor Assoc.
			West Diamond M Ranch
			Windmill Ranch
			Whitney Ranch
			Zeneca Specialties
		Private - Citizen	
Rena Ann	Abolt		
Rev. Mother Beverly	Aitken		
Norman	Ahl		
Carol	Anderson		
Marge	Anderson		
Molly	Anderson		
Alma	Baker		
Berly	Baker		

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
Private - Citizen			
Ken	Baker		
Michael	Baker		
Cecile & Sarah	Barches		
David	Barnes		
Becty	Barrios		
Mary	Bartol		
Stu	Bengson		
Kitty	Bennett		
Dave	Bertelsen		
John & Kay	Berian		
Peter	Bidegon		
Milo	Blecha		
Steve	Bioce		
Clare	Bonnelli		
Bob & Mary	Borman		
John	Bourdeau		
Bill	Branan		
Jerry & Dikie	Brever		
Mette	Brogden		
Gary	Brown		
Gale W.	Bundrick		
Happ	Burnett		
Margie	Buyer		
Sherri	Buzzard		
Ann	Carr		
Vincent & Dee	Cattolica		
Wess	Chambers		
Bob	Chap		
Ben & Patty	Claridge		
Shel	Clark		

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
		Private - Citizen	
Mark	Cleveland		
Meade	Clyne		
Walter & Nancy	Coble		
Diane	Collins		
Glen	Collins		
Jim & Midge	Cole		
Jerry	Coolidge		
Pete	Cowgill		
Leslie J.	Cox		
Genee	Davidson		
Bob	Deming		
James W.	Dettmer		
Bob	Dixon		
Lucille	Dixon		
Sandy	Deitering		
John & Barbara	Donaldson		
Mac & Billie	Donaldson		
Mark	Douglas		
Foster	Drummond		
James	Dunn		
Don	Dybus		
Arlene	Essig		
Mark	Exline		
Morris	Farr		
Julia	Fonseca		
Sidney H.	Franklin		
Brian	Friedman		
Chuck	Frost		
Velma	Furno		
Pat	Gallagher		
Peter	Galvin		
Bill & Sandi	Garbutt		
Dale	Gazzolo		
Stephanie	Gibert		
Kevin	Giddens		
Al	Glynn		
Keith	Graves		
Debbie	Greenside		
Rachel	Grunefelder		
Ken & Ethel	Haber		
Brad	Haber		
Douglas	Hamilton		

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
Private - Citizen			
Traci	Hamilton		
Jan	Hancock		
Diane & Neal	Hanna		
Beth	Hardy		
David	Harker		
Richard	Harris		
Williams	Haynes		
Cisney	Havatone		
Ralph	Higgs		
Leonard	Hines		
David	Hogan		
Don	Hogg		
David	Hoffman		
J. F. & P. D.	Hoffman		
John	Hoffman		
Mac	Hudson		
Gail	Hummel		
Hedi	Hummel		
Ron	Hummel		
Don	Irving		
David	Jacome		
Rukin	Jelks		
Peggy	Johnson		
Drexal	Jones		
Bob	Kamilli		
Walter & Evelyn	Karl		
Tim & Jonelle	Kearney		
Gary	Keller		
Gene & Jerry	Kindred		
Lou Anne	Kirby		
Jake	Kittle		
Doug	Koppinger		
Gerald	Korte		
Alexis	Kostich		
Don	Kucera		
Ray	Kunde		
Jim	Lamb		
Tom	Lajoie		
Charles	LeFevre		
Lainie	Levick		
Cynthia	Lovely		
John & Cynthia	Lunine		

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
Private - Citizen			
Wes & Marilyn	Marshall		
Bob & Darlene	Mansmith		
Ken	Marcus		
George	Masek Jr.		
Vicki	Mattox		
John	Maynard		
Joanne	Meyer		
Pam	Mickolowski		
Mark	Miller		
Michael & Dawn	Milroy		
Larry	Missal		
William	Mories		
Ann	Moote		
Austin	Moss		
Grandy	Montgomery		
Bob	McClain		
Michael	McGah		
Donald	McGann		
Ann	McGreevy		
Barbara	McReynolds		
Carlos	Nagel		
Evalyn	Newhaus		
Lee	Nellis		
James	Notestine		
Russ	O'Brien		
Phil, Patrick & Brenda	Ogden		
Becky	Peterman		
Pete	Pfeifer		
Lon	Pierce		
Rosalee K.	Ponce		
Hec	Ramsey		
Josh	Randall		
Aubrey & Luann	Raus		
Martin	Reff		
Leonard	Riechart		
Tom	Reininger		
Jim & Michey	Renfro		
Raymond	Rich		
Tom	Richter		
Robert	Rivers		
Bob & Joy	Rhinesmith		
Dot	Rhodes		

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
Private - Citizen			
Dan	Robinett		
Bill	Rowekamo		
David	Ruben		
Steve	Saway		
Doug	Sawyer		
Mike	Schenk		
Jeff	Schmidt		
Justin	Schmidt		
Terry	Schwartz		
Cabot	Sedgwick		
Mike	Siedman		
Randy	Simmons		
Doug	Shough		
J. W.	Smith		
Lamar	Smith		
Michael	Smith		
Larry	Snead		
Doug	Snow		
L B	Solsberry		
Jay	Spehar		
Larry	Stallcup		
Doug	Sposito		
John	Startt		
John	Stephanson		
Lewis	Stickford		
Karen & Steve	Strom		
Julie	Stromberg		
Rex & Katie	Stump		
John	Sullivan		
Van	Talley		
Kiyo	Taylor		
Rheal	Tetreault		
T. E.	Tiernay		
Kelly	Tighe		
Ron	Tiller		
Rachel	Thomas		
George	Trigaux		
Sharon	Urban		
Lowell	Van Dyke		
Dusty	Vail Ingram		
Sue Ann	Vannoz		
Mindy	Vaughan		

Las Cienegas RMP Mailing List, continued

First Name	Last Name	Title	Organization
Private - Citizen			
Robert	Veregara		
Donna	Vettleson		
George	Volker		
Mike & Barbara	Wagoner		
David & S. M.	Walker		
Berb	Waters		
Frances	Werner		
Don	Wienstien		
William	Well II		
Betty J.	Wells		
Frank	Wilczek		
Jeff	Williamson		
Paul & Cheryl	Wilson		
Dennis & Mary	Whicker		
Volney	White		
Peter	Whitney		
Ann Marie	Wolf		
Stephen	Wood		
Beth	Wooden		
Barbara	Zook		